

Environmental Setting

3.1 Introduction

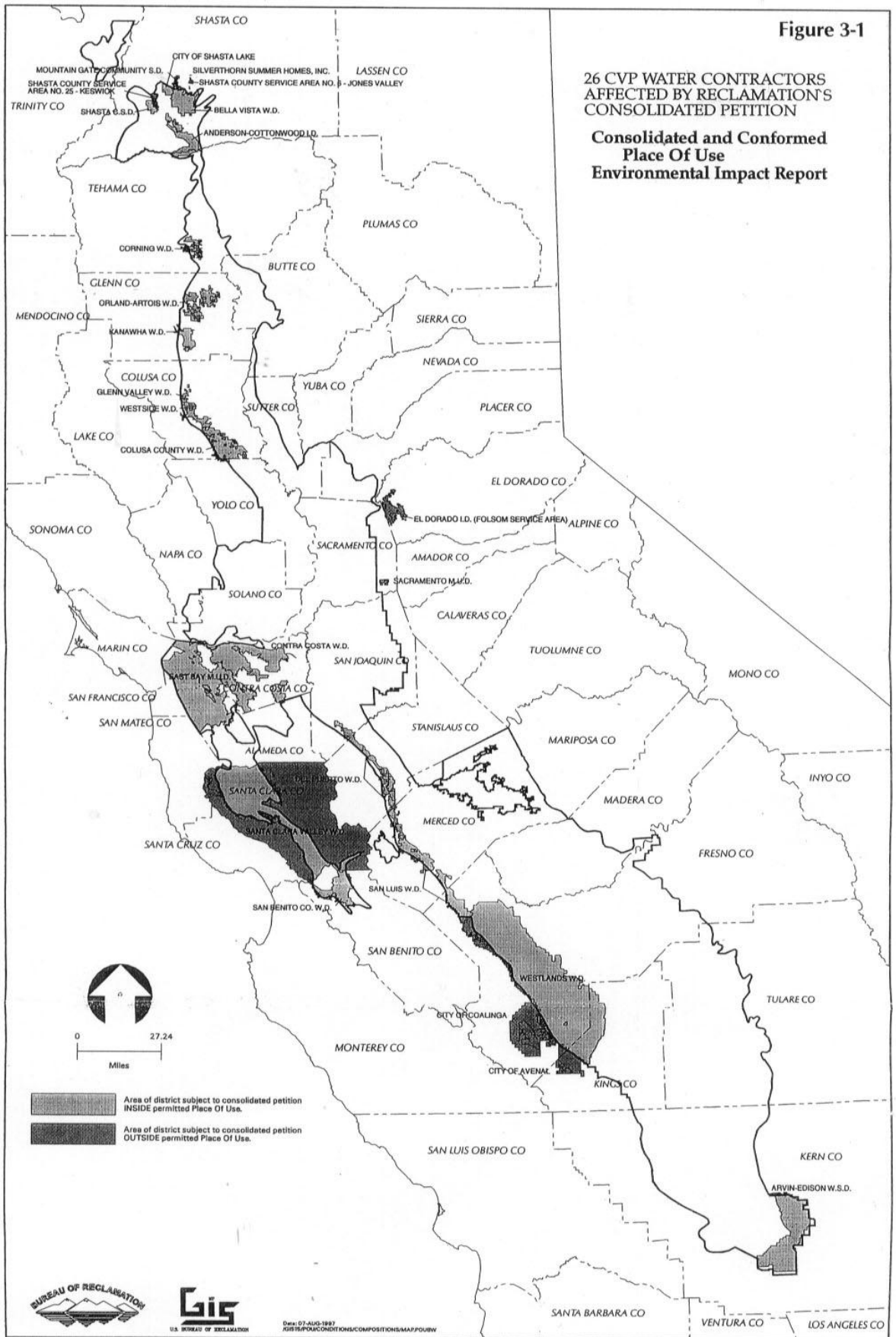
This section describes the general environmental setting of the Central Valley; describes the environmental resources that encompass one or more CVP water contractor service areas; presents physical, biological, and cultural environmental resource data for each of the 26 CVP water contractor service areas; and provides maps showing the uses of lands located within each of the 26 CVP water contractor service areas but outside the authorized POU. Land use designations titled "Irrigated CVP" and "Municipal & Industrial CVP" on the land use maps denote encroachment lands. The other map designations denote expansion lands. Acreages listed in this EIR are based on Reclamation's records using GIS and may differ from the acreages provided by other sources.

3.2 General Environmental Setting

Lands that would be affected by the Proposed Project and alternatives are located throughout the Central Valley, from the City of Shasta Lake in the north to the City of Bakersfield in the south (Figure 3-1). The lands extend from the San Francisco Bay Area eastward to the Sierra Nevada foothills. About 834,667 acres of land would be affected by the Proposed Project and alternatives.

Climate, topography, geology, and ecological conditions vary widely throughout the Central Valley. In general, agricultural lands served by CVP water contractors have relatively little topographic relief. The climate is characterized by warm to hot dry summers with relatively long growing seasons, interspersed with relatively mild wet winters. The geology and soils of most agricultural lands are conducive to commercial agricultural production with limited improvements required. Rainfall is all but absent during the growing season, requiring irrigation to meet crop water requirements.

M&I lands served by CVP water contractors vary in location, topography, climate, and vegetative cover. Depending on location, the climate of these lands varies from relatively cool summers in the San Francisco Bay Area to hot summers in the Central Valley and Sierra Nevada foothills. Vegetation, soils, and geology also vary by location. Geologic formations range from the sedimentary deposits of the coastal mountains and Central Valley to the volcanic and granitic formations of the Sierra Nevada foothills.



3.3 Environmental Resources of the Lands Outside the POU

3.3.1 Water Use

The CVP extends from the Cascade Range south to the Kern River. The CVP stores and distributes water of the Sacramento, American, and Trinity rivers for use in the Sacramento River Basin, San Joaquin Valley, and San Francisco Bay Area. Water from the Sacramento, American, and Trinity rivers is pumped from the Sacramento-San Joaquin Delta to places of use south of the Delta.

Reclamation currently has water contracts with 236 contractors to deliver CVP water. These contractors are listed in Tables B-1 and B-2 in Appendix B. The total volume of water contracted is 4,915,867 acre-feet annually. An additional 850,675 acre-feet are also contracted on a temporary basis (Class 2 water contracts).

A total of 2,445,263 acre-feet is contracted for annual delivery to the 26 water contractors that would be affected by Reclamation's CPOU petition. Table 3-1 identifies the amount of CVP water supplies contracted for annual delivery to each CVP water contractor that would be affected by Reclamation's CPOU petition.

CVP Water Contractor	Purchased under Long-Term Contract (acre-feet)	Type of CVP Water Delivery Contract	
		Municipal and Industrial (acre-feet)	Agricultural (acre-feet)
Anderson-Cottonwood Irrigation District	10,000		10,000
Arvin-Edison Water Storage District	40,000 ^a		
Avenal, City of	3,500	3,500	
Bella Vista Water District	24,000	7,000	17,000
Coalinga, City of	10,000	10,000	
Colusa County Water District	62,200		62,200
Contra Costa Water District	195,000	195,000	
Corning Water District	25,300		25,300
Del Puerto Water District	140,210 ^b		
East Bay Municipal Utility District	150,000	150,000	
El Dorado Irrigation District	7,550	7,550	
Glenn Valley Water District	1,730		1,730
Kanawha Water District	45,000		
Mountain Gate Community Services District	350	350	
Orland-Artois Water District	53,000		53,000
Sacramento Municipal Utility District	60,000	60,000	
San Benito County Water District	43,800	8,250	35,550
San Luis Water District	125,080 ^b		
Santa Clara Valley Water District	152,500	119,400	33,100

CVP Water Contractor	Purchased under Long-Term Contract (acre-feet)	Type of CVP Water Delivery Contract	
		Municipal and Industrial (acre-feet)	Agricultural (acre-feet)
Shasta Community Services District	1,000	1,000	
Shasta County Service Area No. 6— Jones Valley	190	190	
Shasta County Service Area No. 25— Keswick	500	500	
Shasta Lake, City of	2,750	2,750	
Silverthorn Summer Homes, Inc.	15	15	
Westlands Water District	1,150,000	6,000	1,144,000
Westside Water District	25,000		25,000
TOTAL	2,328,675	571,505^c	1,406,880^c

^aClass 1 water supply, not classified as a M&I or agricultural type.
^bMulti-purpose contract that does not designate specific quantities for agricultural and M&I deliveries.
^cThese totals do not include quantities for Arvin-Edison Water Storage District, Del Puerto Water District, Kanawha Water District, and San Luis Water District because the water deliveries for M&I or agricultural are not specified.

3.3.1.1 Operations of the CVP

CVP water stored in Reclamation-operated reservoirs is delivered in accordance with individual contracts with water contractors. Water is stored and released from the CVP facilities by Reclamation in the most efficient and economical manner. Distribution of water from the main canals to the individual users is the responsibility of each CVP water contractor. As a result of these operations, water from any CVP facility may be released for use in any part of the CVP service area where it is practical and feasible to convey the water.

3.3.1.2 Authorized Uses

Table 3-2 lists the authorized purposes of use and places of use assigned to each water right permit included in Reclamation's CPOU petition. As shown, the assigned purposes and places of use vary from permit to permit. These water right conditions do not necessarily correspond with the actual operations of the CVP.

As part of its Decision 990 discussion of navigation and flood control (Applications 9364 and 5626), the SWRCB declared that storage of water or regulation of flow for navigation and flood control purposes is a continuing paramount power of the United States, and that for the SWRCB to grant a permit to use water for such purposes pursuant to these applications would be improper. In addition, Decision 990 declared that adding a permit term would add nothing to the constitutional power of federal authority, and to the extent that such permit term were to purport to limit such power, it would clearly be an invasion of federal power (State Water Rights Board, 1961).

Table 3-2 Existing Authorized Use of CVP Water Supplies											
State Water Board Permit No.	Source and Major CVP Facilities	Place of Use	Permitted Use								
			Irrigation ^a	Domestic	Municipal	Industrial	Fish and Wildlife Enhancement	Salinity Control	Water Quality Control	Stock- watering	Recreation
11315	American River Folsom Dam	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties	*						*		
11316	American River Folsom Dam	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties		*	*	*					*
11967	Trinity River Trinity Dam Lewiston Dam Spring Creek Tunnel Delta Mendota Canal	Sacramento and San Joaquin valleys, and Delta area	*	*					*		
11968	Trinity River Trinity Dam Lewiston Dam Spring Creek Tunnel Delta Mendota Canal	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties			*	*					
11969	Trinity River Trinity Dam Lewiston Dam Spring Creek Tunnel Delta Mendota Canal	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties	*	*				*		*	*
11971	Trinity River Trinity Dam Lewiston Dam Spring Creek Tunnel Delta Mendota Canal	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties	*	*						*	
11973	Trinity River Trinity Dam Lewiston Dam Spring Creek Tunnel Delta Mendota Canal	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties	*	*	*	*		*	*		*
12364	Clear Creek Whiskeytown Dam Delta Mendota Canal Contra Costa Canal	Sacramento and Stockton areas; Delta area; San Joaquin Valley; Alameda, Santa Clara, and San Benito counties	*	*						*	*

**Table 3-2
Existing Authorized Use of CVP Water Supplies**

State Water Board Permit No.	Source and Major CVP Facilities	Place of Use	Permitted Use									
			Irrigation ^a	Domestic	Municipal	Industrial	Fish and Wildlife Enhancement	Salinity Control	Water Quality Control	Stock-watering	Recreation	
12721	Sacramento River Shasta Dam Delta Mendota Canal	Sacramento Valley, Delta area, and San Joaquin Valley	x	x							x	x
12722	Sacramento River Shasta Dam Delta Mendota Canal	Sacramento Valley; Delta area; San Joaquin Valley; Solano, Contra Costa, Sacramento, and San Joaquin counties			x	x						
12723	Sacramento River Shasta Dam Delta Mendota Canal	Sacramento Valley, Delta area, and San Joaquin Valley	x	x							x	x
12725	Rock Slough (Delta) Contra Costa Canal	Contra Costa County	x	x								
12726	Rock Slough (Delta) Contra Costa Canal	Contra Costa County			x	x						
12727	Old River (Delta) Delta Mendota Canal	San Joaquin Valley floor	x	x								
12860	Old River (Delta) San Luis Dam Offstream storage via Delta Mendota Canal	San Joaquin Valley	x	x	x	x					x	x
15735	Rock Slough (Delta) Contra Loma Dam Offstream storage via Contra Costa Canal	Contra Costa County	x	x	x	x				x		x

^a Irrigation includes water for frost protection and heat control.

Some permits currently have navigation and flood control listed as purposes of use. Navigation and flood control purposes will be deleted from those permits that still contain these purposes.

3.3.2 Water Quality

Water quality characteristics vary throughout the CVP service area. The major water features of the CVP service area are the Sacramento River, American River, Sacramento-San Joaquin Delta, and San Joaquin River. Factors contributing to water quality include the quality of inflow from natural and human-made sources, effects related to the operation of CVP facilities, and influences associated with local land use practices.

3.3.2.1 Sacramento River

The Sacramento River Basin covers 27,210 square miles. For planning purposes, this includes all watersheds tributary to the Sacramento River that are north of the Cosumnes River watershed. It also includes the closed basin of Goose Lake and drainage sub-basins of Cache and Putah Creeks.

The principal streams are the Sacramento River and its larger tributaries: the Pit, Feather, Yuba, Bear, and American rivers to the east; and Cottonwood, Stony, Cache, and Putah creeks to the west. Major reservoirs and lakes include Shasta, Oroville, Folsom, Clear Lake, and Lake Berryessa.

The northern portion of the CVP includes Shasta, Clair Engle, and Whiskeytown reservoirs; and the mainstem and tributary streams of the upper Sacramento River, which are generally high-quality, coldwater habitats. Sacramento River water quality is generally good, and most drinking water standards are consistently met at Sacramento.

During most periods of the year, the reservoirs release water of low turbidity, suspended solids, color, and nutrient content. The reservoirs maintain both warmwater and coldwater fish habitats in summer, and produce relatively low algae and have minimal oxygen depletion because of their nutrient-limited character.

The reservoirs influence the rivers by moderating downstream temperatures. Water temperatures downstream of the dams are higher in summer and lower in winter than upstream of the dams. As the Sacramento River flows downstream of Shasta Lake, water quality gradually changes because of the addition of agricultural return water, permitted discharges, and acid mine drainage enriched in metals. The trend is toward higher constituent concentrations downstream of Shasta Lake.

3.3.2.2 American River

The American River watershed drains an area of 1,900 square miles, extending from the Central Valley floor near sea level to more than 10,000 feet elevation. The water quality of the drainage is good as it drains toward Folsom Reservoir. Downstream of Nimbus Dam, the river changes character from a gravel/cobble bed mountain stream to a slower flowing, sandy bottom river when it joins the Sacramento River. In general, the river remains oxygenated and has low dissolved concentrations of solids throughout its length. Significant amounts of agricultural drainage are not being discharged to the river.

3.3.2.3 Sacramento-San Joaquin Delta

The Sacramento-San Joaquin Delta is a complex system of deepened and channelized rivers and sloughs of widely varying depth, flow, and water quality. The San Joaquin and Sacramento rivers meet the relatively minor flows of the Cosumnes and Mokelumne rivers and merge their waters in the Delta.

The resulting water quality of the Delta channels reflects a mixture of a large volume of higher quality water from the north (Sacramento River and American River drainages) with a relatively small volume of low-quality water from the south (San Joaquin River drainage). Salinity, including saltwater intrusion from the San Francisco Bay estuary, and agricultural drainage are the primary water quality issues of concern for the Delta. Annual seasonal saltwater intrusion is now limited to some areas of the western Delta by water management of the CVP and State Water Project (SWP) (Herbold and Moyle, 1989; Skinner, 1972). Reverse flows can occur in the fall when CVP and SWP pumping increases compared to Sacramento River inflow to the Delta, resulting in saltwater intrusion.

Specific water quality objectives have been established for M&I beneficial uses, agricultural beneficial uses, and fish and wildlife beneficial uses. Water quality objectives for the Delta are set forth in the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (SWRCB, 1995) and the Bay-Delta Accord (SWRCB, 1994). These forums established objectives for dissolved oxygen, salinity, Delta outflow, river flows, export limits, toxic chemicals, bacterial contamination, and Delta Cross Channel operations.

3.3.2.4 San Joaquin River

The San Joaquin River Basin covers 15,880 square miles. It includes all watersheds tributary to the San Joaquin River and the Delta south of the Sacramento River and south of the American River watershed. This watershed excludes those lands that drain to the Tulare Lake Basin.

The principal streams in the basin are the San Joaquin River and its larger tributaries: the Cosumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

After leaving the Sierra Nevada, the river enters the Central Valley floor where its flows are subject to agricultural, municipal, and industrial water diversions. In addition, the river receives drainage flows from agricultural lands located in the San Joaquin Valley. As a result of these agricultural discharges and the historical alteration of surface water flows, groundwater supplies, and land use, water quality has been significantly altered. Discharges of agricultural drainage, containing salts, selenium, boron, molybdenum, and other trace elements, have degraded the water quality of the San Joaquin River.

3.3.3 Groundwater Resources

The CVP water contractors affected by the Proposed Project are located in the Sacramento Valley, Redding, San Joaquin Valley, and eastern and southern San Francisco Bay Area groundwater basins. Groundwater quality in these basins is generally good; however, groundwater quality in certain areas of the San Joaquin Valley and the San Francisco Bay Area has been degraded by agricultural and industrial activities.

Estimates of the total potential groundwater in storage in each of the basins are discussed below. The groundwater actually available for beneficial use is likely to be much less than the total volume in groundwater storage because of site-specific geologic, water quality, and groundwater flow conditions.

3.3.3.1 Sacramento Valley

The Sacramento Valley groundwater basin is composed of permeable alluvial deposits thousands of feet thick. The estimated total volume of groundwater in storage in the basin is over 113 million acre-feet (DWR, 1975). Well yields are variable throughout the basin, but generally high-capacity wells can be drilled. Groundwater quality is good, with isolated areas of high boron, chloride, and other constituents that could limit groundwater use. Saline groundwater underlies the entire basin at variable depths. The groundwater basin is generally full; groundwater overdraft occurs in certain areas.

3.3.3.2 Redding

The Redding groundwater basin covers about 510 square miles in the northern part of the Central Valley of California and is surrounded by the Cascade Range, Klamath Mountains, and Coast Ranges. It is separated from the main part of the valley by the Red Bluff Arch, a subsurface geologic structure. The Redding groundwater basin is composed of alluvial deposits thousands of feet thick. Estimated storage capacity in the uppermost 200 feet of saturated rock in the basin is 5.5 million acre-feet (U.S. Geological Survey [USGS], 1983). Well yields vary throughout the basin but are generally high, especially in areas that are underlain by coarse gravel derived from volcanic mudflow deposits to the east. Water quality is generally good, but saline groundwater underlies the entire basin. Along the margins of the basin where saline groundwater is found at shallow depths, groundwater supplies are limited.

3.3.3.3 San Joaquin Valley

The San Joaquin Valley groundwater basin is composed of alluvial and lacustrine sediments many thousands of feet thick. The estimated storage capacity of the basin¹ is about 570 million acre-feet (DWR, 1975). Well yields are high throughout the valley. Corcoran clay, a major confining subsurface layer, extends throughout much of the valley. Intense pumping in the past caused a major overdraft to San Joaquin Valley aquifers, resulting in significant subsidence in some areas.

The delivery of surface water has reduced groundwater overdraft in most areas; however, groundwater overdraft still occurs in the southern part of the valley. The water quality of the confined aquifers is good, but in the shallower aquifers, salts and chemicals associated with agricultural and industrial activities have degraded groundwater quality. Poor-quality shallow groundwater historically has existed on the west side of the San Joaquin Valley; in addition, areas of poor quality groundwater are localized in other areas of the San Joaquin Valley.

3.3.3.4 Eastern and Southern San Francisco Bay Area (including the Santa Clara Valley)

The Eastern and Southern San Francisco Bay Area groundwater basin, which includes the Santa Clara Valley, is underlain by alluvial and estuarine sediments many thousands of feet thick. Typically,

¹The Tulare subbasin is considered a component of the San Joaquin Valley Basin.

permeable sands and gravel are separated by less permeable silt and clay. The estimated storage capacity of this basin is about 12.2 million acre-feet (DWR, 1975). Well yields are high throughout the basin but tend to increase with distance from the bay.

In the past, significant groundwater overdraft caused steep declines in groundwater levels that, in turn, caused saltwater intrusion and subsidence. The delivery of surface water to the area has resulted in increased recharge and decreased pumpage. A significant portion of the recharge to this basin is artificial. Groundwater quality in the basin is good, except for localized contamination by industrial chemicals.

3.3.4 Air Quality

Lands within the boundaries of the 26 CVP water contractor service areas located outside the authorized POU are situated in five air basins: the Sacramento Valley Air Basin, the San Joaquin Valley Air Basin, the San Francisco Bay Area Air Basin, the North Central Coast Air Basin, and the Mountain Counties Air Basin.

The climate in these air basins varies depending on their proximity to the Pacific Ocean and influence by local topography. Seasons in the interior valleys are characterized by low winter and high summer temperatures. In addition, air stagnation and inversions are common in the valleys, contributing to the degradation of local air quality.

3.3.4.1 Air Quality Standards

The state and federal governments have established ambient air quality standards for the criteria pollutants (Table 3-3). These standards were established to provide an adequate margin of safety to protect the public health and welfare. California Ambient Air Quality Standards (CAAQS) tend to be more stringent than the National Ambient Air Quality Standards (NAAQS), as shown in Table 3-3.

Pollutant	Averaging Period	California Standards ^a	National Standards ^b	
			Primary ^c	Secondary
Ozone	1 Hour	0.09 ppm	0.12 ppm	0.12 ppm
Carbon Monoxide (CO)	8 Hour	9.0 ppm	9 ppm	--
	1 Hour	20 ppm	35 ppm	--
Nitrogen Dioxide (NO ₂)	Annual Average	--	0.053 ppm	0.53 ppm
	1 Hour	0.25 ppm	--	--
Sulfur Dioxide (SO ₂)	Annual Average	--	0.03 ppm	--
	24 Hour	0.04 ppm	0.14 ppm	--
	3 Hour	--	--	0.5 ppm
	1 Hour	0.25 ppm	--	--
Suspended Particulate Matter (PM ₁₀)	Annual Geometric Mean	30 µg/m ³	--	--
	24 Hour	50 µg/m ³	150 µg/m ³	150 µg/m ³
	Annual Arithmetic Mean	--	50 µg/m ³	50 µg/m ³
Sulfates	24 Hour	25 µg/m ³	--	--
Lead (Pb)	30-day	1.5 µg/m ³	--	--
	Calendar Quarter	--	1.5 µg/m ³	1.5 µg/m ³
Hydrogen Sulfide	1 Hour	0.03 ppm	--	--
Vinyl Chloride	24 Hour	0.010 ppm	--	--
Visibility Reducing Particles	8 Hour (10 am to 6 pm, PST)	see footnote e	--	--

^a California standards for ozone, carbon monoxide, sulfur dioxide (1-hour), nitrogen dioxide, PM₁₀, and visibility reducing particles are not to be exceeded. The sulfur dioxide (24-hour), sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.

^b National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

^c National Primary Standards: The levels of air quality necessary with an adequate margin of safety to protect the public health.

^d National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

^e Insufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.

Source: California Air Resources Board, 1995.

Counties within the five air basins have been classified as either nonattainment, attainment, or unclassified for achieving NAAQS and CAAQS. The national and state air quality attainment statuses for the air basins in which the affected water contractors are located are listed in Table 3-4. Some of the counties do not currently monitor the levels of certain criteria pollutants; therefore, those counties are unclassified for these pollutants. For air quality planning purposes, areas designated as unclassified are equal to areas designated as attainment.

3.3.4.2 Emission Sources

Lands in the project area support four basic land uses: irrigated agriculture, dryland agriculture (dry cropped, fallow, idle, or grazed), municipal and industrial, and undeveloped (native vegetation). The primary pollutants associated with all four land uses include particulate matter and hydrocarbons (or organic gases) that may serve as ozone precursors.

Primary sources of hydrocarbon emissions from irrigated and dryland agriculture are pesticide and fertilizer application, fuel combustion in vehicles and farm equipment, and field burning. Sources of particulate emissions are field burning and farm operations, such as tilling, plowing, and driving farm equipment on loose earth, as well as entrained road dust and fuel combustion in vehicles and farm equipment.

Primary sources of hydrocarbon emissions from M&I land uses include fuel combustion in vehicles and industrial equipment, painting and solvent use, and residential heating. Dust entrained in pavement, structural and auto fires, construction and demolition, residential fuel combustion, and vehicle use are a few sources of particulate emissions.

In undeveloped areas, hydrocarbon emissions are primarily emitted from wildfires and vegetation. Particulate emissions emanate from windblown dust and wildfires.

Table 3-4 National and State Air Quality Attainment Status for Criteria Pollutants in the Project Area												
Area	National					State						
	O ₃	CO	NO ₂	SO ₂	PM ₁₀	O ₃	CO	NO ₂	SO ₂	PM ₁₀	Pb	SO ₄
Sacramento Valley Air Basin												
Colusa County Colusa County Water District Glenn Valley Water District Westside Water District	U/A	U/A	U/A	U	U	N	U	A	A	N	A	A
Glenn County Kanawha Water District Orland-Artois Water District	U/A	U/A	U/A	U	U	N	U	A	A	N	A	A
Sacramento County El Dorado Irrigation District Sacramento Municipal Utility District	N	N/U/A	U/A	U	N	N	T/A	A	A	N	A	A
Shasta County Anderson-Cottonwood Irrigation District Bella Vista Water District Mountain Gate Community Services District Shasta County Service Area No. 6—Jones Valley Shasta County Service Area No. 25—Keswick Shasta Community Services District Shasta Lake, City of Silverthorn Summer Homes, Inc.	U/A	U/A	U/A	U	U	N	U	A	A	N	A	A

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Tehama County Anderson-Cottonwood Irrigation District Corning Water District	U/A	U/A	U/A	U	U	N	U	A	A	N	A	A
Yolo County Colusa County Water District	N	N/U/A	U/A	U	U	N	A	A	A	N	A	A
San Joaquin Valley Air Basin												
Fresno County Avenal, City of Coalinga, City of San Luis Water District Westlands Water District	N	N/U/A	U/A	U	N	N	N/A	A	A	N	A	U
Kern County Arvin-Edison Water Storage District	N	N/U/A	U/A	A	N	N	A	A	A	N	A	U
Kings County Avenal, City of Westlands Water District	N	U/A	U/A	U	N	N	U	A	A	N	A	U
Merced County Del Puerto Water District San Luis Water District	N	U/A	U/A	U	N	N	U	A	A	N	A	U
San Joaquin County Del Puerto Water District	N	N/U/A	U/A	U	N	N	A	A	A	N	A	U
Stanislaus County Del Puerto Water District	N	N/U/A	U/A	U	N	N	A	A	A	N	A	U
San Francisco Bay Area Air Basin												
Alameda County East Bay Municipal Utility District Contra Costa Water District	U/A	N	U/A	A	U	N	A	A	A	N	A	A
Contra Costa County East Bay Municipal Utility District Contra Costa Water District	U/A	N	U/A	A	U	N	A	A	A	N	A	A
Santa Clara County San Benito County Water District Santa Clara Valley Water District	U/A	N/U/A	U/A	A	U	N	A	A	A	N	A	A
North Central Coast Air Basin												
San Benito County San Benito County Water District Santa Clara Valley Water District	N	U/A	U/A	U	U	N	U	A	A	N	A	A
Santa Cruz County San Benito County Water District	N	U/A	U/A	U	U	N	U	A	A	N	A	A
Mountain Counties Air Basin												
El Dorado County El Dorado Irrigation District	N	N	U/A	U	U	N	U	A	A	N	A	A
T = Transition N = Nonattainment A = Attainment U = Unclassified / = This symbol separates the urbanized areas from the remainder of the county Source: California Air Resources Board, 1996.												

3.3.5 Fish Resources

Important game fish in the Sacramento River include steelhead trout, striped bass, American shad, sturgeon, and four races of chinook salmon. Chinook and coho salmon and steelhead trout are the major coldwater fish species of the Trinity River. Hatchery-reared rainbow trout, kokanee salmon, and largemouth and smallmouth bass are the primary fish species in Shasta and Clair Engle reservoirs. More than 40 fish species inhabit the lower American River; fall-run chinook salmon, steelhead trout, and American shad are the dominant species. Folsom Reservoir features such species as chinook and kokanee salmon, hatchery-reared rainbow trout, largemouth and smallmouth bass, catfish, and various sunfish. Forty-eight species live in or annually migrate through the Delta area; the most popular game fish are striped bass and chinook salmon.

3.3.5.1 Fish Species in Reservoirs, Rivers, and the Delta

Shasta and Clair Engle Reservoirs. These two large CVP reservoirs sustain both warmwater and coldwater species. The primary fish species are hatchery-reared rainbow trout, kokanee salmon, and largemouth and smallmouth bass. Extreme water level fluctuations characteristic of reservoirs can adversely affect these fish resources. Rapid changes in reservoir levels are more detrimental than long-term fluctuations. Bass and many of the nongame fish species may spawn in shallow water, and the spawning area may become dry during egg incubation. The months of most concern for nest dewatering are April through June. The availability of suitable habitat may vary greatly from year to year. In particular, shoreline vegetation used for cover may be totally eliminated in some years, which could affect habitat values.

Folsom Reservoir and Lake Natoma. Water levels fluctuate greatly in both reservoirs; Folsom in a seasonal and annual pattern, and Natoma on a daily and weekly cycle. Lake Natoma is the regulating afterbay of Folsom Reservoir. Folsom Reservoir sustains both coldwater and warmwater species. Landlocked chinook and kokanee salmon plus hatchery-reared rainbow trout dominate the coldwater fish populations; large and smallmouth bass, catfish, and various sunfish are the major warmwater species present. The high rate of flushing and drawdown of Lake Natoma contributes to its poor fish environment. The reservoir species are affected by alterations of shoreline habitat caused by water level fluctuations in the same manner as in the Shasta and Clair Engle reservoirs.

Sacramento River. Important game fish include steelhead trout and four races of chinook salmon, as well as warmwater and coldwater resident species in the 300 miles of habitat between Keswick Dam and the Delta. Winter-run chinook salmon constitute a small portion of the total salmon population. This species is listed as a state endangered species and a federal endangered species because it has declined significantly in recent years. Steelhead trout within the Central Valley Evolutionary Significant Unit are proposed to be listed as endangered. The National Marine Fisheries Service is expected to list this species as endangered in late-1997. Sacramento River fish species are presented in Table C-1 in Appendix C.

Appropriate spawning temperatures and substrate that are undisturbed for several months are key to chinook salmon spawning success. Spawning chinook require clean gravel substrate and water temperatures in the range of 44°F to 58°F. Juvenile salmon also have water velocity, depth, cover, and temperature requirements and need an adequate food supply.

Other important game fish of the Sacramento River are striped bass, American shad, and sturgeon. The semi-buoyant eggs of striped bass and shad make them less susceptible to direct effects of seasonal changes in flow on egg or larval survival. Sturgeon produce adhesive eggs that attach to the substrate, but they spawn in deeper, warmer reaches of the lower river than salmon and trout, and the larvae are washed downstream into the Bay Delta estuary. Therefore, they are less affected than salmonids by changes in flow or temperature.

Species of interest to the state because of declining abundance are the hardhead and Sacramento splittail. The Sacramento splittail is proposed for federal threatened status. The Delta smelt is listed as a state threatened species and a federal threatened species.

Trinity River. Clair Engle Reservoir is the major reservoir on the Trinity River that blocks the historical salmon and steelhead spawning reaches of the upper river. The habitat area below Lewiston Dam has been reduced by temperature and flow changes. Currently, the upper reaches of the river are affected by sedimentation, loss of riparian vegetation, and temperature and flow changes.

Chinook and coho salmon and steelhead trout are the major coldwater fish species of the Trinity River. Their populations are sustained by hatchery production; the fish hatchery was built as mitigation for habitat lost upstream of Lewiston Dam. Changes that affect the flow and temperature regime of the river may affect salmon and steelhead survival.

American River. American River habitat is characterized by a series of mountain stream tributaries that drain to Folsom Reservoir and Lake Natoma at Nimbus Dam. Gravel enrichment in the portion of the river downstream of Nimbus Dam has been limited by sediment trapping behind the reservoirs, and downstream river flows are almost totally controlled by the reservoir. Peak discharges before Folsom Dam was constructed were from March through June; now the discharge peak occurs during winter months.

More than 40 fish species inhabit the lower American River (Table C-2 in Appendix C). Game fish are dominated by chinook salmon (fall-run only), steelhead trout, and American shad, all of which enter the river to spawn. Striped bass frequent the lower river in summer but have not been known to spawn there. Non-game fish include the hardhead and Sacramento splittail.

Sacramento-San Joaquin Delta. The Delta environment, once historically dominated by coldwater species, is now dominated by warmwater species. Currently, 48 species live in or migrate annually through the Delta area (Table C-3 in Appendix C). The major habitat modifications of the Delta have been the conversion of wetlands to channelized streams, including channel straightening, the removal of riparian vegetation, increased siltation, and water quality changes. Pumping from the Delta for the SWP and CVP, as well as upstream reservoir regulation of flows, has also affected the seasonality of flow regimes and the extent of saltwater intrusion into the Delta habitat.

The flow and water quality of the San Joaquin River as it enters the Delta are balanced by the western Sierra Nevada flows of the upper San Joaquin, Merced, Tuolumne, and Stanislaus rivers, and the agricultural drainage input from the valley area, mostly through Salt and Mud sloughs near Los Banos. The Mokelumne River joins the Delta separately. In general, the Sierra Nevada drainage is of high water quality, while the valley input is poor. The balance between the two sources varies seasonally, with summer flows often dominated by agricultural runoff in the portion of the San Joaquin River immediately downstream of Salt and Mud sloughs (before the dilution of flows from the Tuolumne River). The northern Delta is characterized by greater flows and higher species diversity but lower numbers of fish.

The southern Delta tends to have a higher abundance of mostly introduced species (Herbold and Moyle, 1989).

The most popular game fish are striped bass and chinook salmon. Largemouth bass and several species of catfish are caught in Delta waters as well. Species of interest to the state because of declining abundance are the hardhead and Sacramento splittail. The Sacramento splittail is proposed for federal threatened status.

The Delta smelt is listed as a state and federal threatened species. Its numbers have declined greatly in recent years. The March 6, 1995, U.S. Fish and Wildlife Service (USFWS) biological opinion indicates that the Delta smelt decline is linked to declining estuarine habitat (USFWS, 1995). The Delta smelt population depends on the estuarine null zone (the meeting area of freshwater flows with saltwater) for spawning, rearing, and migration. The null zone is a highly variable habitat, and factors such as increased siltation and alteration of the circulation patterns of the estuary have resulted in the loss of this habitat. In addition to habitat degradation and loss of estuarine habitat, the Delta smelt has been subjected to entrainment upstream and reverse flows of water in the Sacramento-San Joaquin Delta and San Joaquin River (Moyle et al., 1992). These conditions occur during droughts and vary according to the amount of flow being diverted from the Sacramento-San Joaquin Delta (Monroe and Kelly, 1992).

3.3.6 Terrestrial Biological Resources

Seven habitat types have been identified on lands within the CVP water contractor service areas that are located outside the authorized POU. These habitats maintain numerous plant and wildlife species, including special-status species (species designated by federal and state resource agencies for special management considerations).

3.3.6.1 Fresh Emergent Wetland

This habitat is found throughout the state, and occurs on most exposures and slopes at most elevations. It is most common on level to gently rolling topography below elevation 7,500 feet mean sea level (msl). Emergent wetlands are inundated frequently and occur in association with several terrestrial or aquatic habitats, including riverine, lacustrine, and wet meadow habitats (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in fresh emergent wetlands are presented in Table D-1 in Appendix D.

3.3.6.2 Annual Grassland

This habitat occurs throughout the Central Valley, mostly on level plains to gently rolling foothills. Annual grassland occurs at higher elevations surrounding valley-foothill riparian, alkali scrub, and fresh emergent wetland; and below valley oak woodland, blue oak woodland, blue oak-digger pine, chamise-redshank chaparral, and mixed chaparral habitats. Vegetation and wildlife species typically occurring in annual grasslands are presented in Table D-1 in Appendix D.

Vernal pools are a special form of wetlands within annual grassland habitats that may occur within the boundaries of two affected CVP water contractors. Vernal pools are shallow depressions filled with water from winter storms that subsequently dry up during spring or early summer. Vegetation is characterized by annual herbaceous plants (Holland and Keil, 1989). The CVP water contractors that

have a medium to high potential for having these communities within their boundaries are Anderson-Cottonwood Irrigation District and Sacramento Municipal Utility District.

3.3.6.3 Alkali Scrub

This habitat occurs in the San Joaquin Valley in areas with low levels of precipitation and relative humidity, hot summer and cool winter temperatures, and an abundance of sunny days. Plant species composition varies along moisture, salinity, and microtopographic gradients (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in alkali scrub habitat are presented in Table D-1 in Appendix D.

3.3.6.4 Mixed Chaparral

This habitat typically occurs below 5,000 feet msl on mountain ranges throughout the state. Mixed and chamise-redshank chaparral habitats occur as a vegetative mosaic on low to middle elevation slopes. In northern California, mixed chaparral merges with annual grassland and blue oak-digger pine habitats at lower elevations. Species composition changes between northern and southern California and with precipitation, slope aspect, and soil type (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in mixed chaparral habitat are listed in Table D-1 in Appendix D.

3.3.6.5 Valley-Foothill Hardwood

Valley-foothill hardwood includes three different habitat types dominated by oaks: blue oak woodland, valley oak woodland, and blue oak-digger pine. Blue oak woodland and valley oak woodland occur outside the authorized POU, yet within the boundaries of several CVP water contractors. Blue oak woodland generally occurs between 500 and 2,000 feet msl elevation at the northern end of its range and from 250 to 3,000 feet msl in the central Coast Range. Valley oak woodland occurs in the Central Valley and Coast Range in remnant patches usually below 2,000 feet msl. Blue oak-digger pine generally rings the foothills of the Central Valley between 500 and 3,000 feet msl elevation (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in the three habitat types are presented in Table D-1 in Appendix D.

3.3.6.6 Montane Hardwood

This habitat ranges throughout California, mostly west of the Cascade-Sierra Nevada crest at elevations from 300 to 9,000 feet msl. At lower elevations, neighboring habitats include valley-foothill hardwood-conifer and mixed chaparral. Typical montane hardwood habitat is composed of a pronounced hardwood tree layer with poorly developed shrub and herbaceous layers. Montane hardwood-conifer occurs throughout California, following the upper and/or inland margins of the coastal redwood or Douglas fir habitats. Elevations range from 1,000 to 4,000 feet msl in the north and from 2,000 to 5,800 feet msl in the south. Montane hardwood-conifer is transitional between dense coniferous forest and montane hardwood habitats (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in montane hardwood habitat are listed in Table D-1 in Appendix D.

3.3.6.7 Valley-Foothill Riparian

This habitat is found in association with annual and perennial grasslands and oak woodland habitats, and ranges in elevation from sea level to 3,000 feet msl. Valley-foothill riparian habitats are typically found in valleys bordered by alluvial fans, lower foothills, and coastal plains (Holland and Keil, 1989). Vegetation and wildlife species typically occurring in the valley-foothill riparian habitat are presented in Table D-1 in Appendix D.

3.3.6.8 Special-Status Species

Special-status plant and animal species that may inhabit lands located outside the authorized POU but within the boundaries of CVP water contractors affected by Reclamation's petition are listed in Table D-2 in Appendix D. This table identifies those areas where, based upon available information, suitable habitat exists that is capable of supporting such species. In addition, Section 3.4 identifies special-status species that have been observed within each CVP water contractor service area located outside the authorized POU.

3.3.7 Cultural Resources

Each CVP water contractor area outside the authorized POU has the potential for having cultural resource sites that could be affected by future land development. Water contractor areas with rivers, streams, lakes, and abundant native food supplies have a higher potential for cultural resource sites existing within their boundaries than water contractor areas where these do not exist.

3.3.7.1 Prehistory

The CVP area has a long and complex history with distinct regional patterns that extend back more than 11,000 years. Evidence for the presence of prehistoric peoples in the CVP area is represented by the distinctive fluted spear points found on the margins of extinct lakes in the San Joaquin Valley.

Approximately 8,000 years ago, many California cultures shifted the main focus of their subsistence strategies from hunting to seed gathering as evidenced by the increase in food-grinding implements found in archaeological sites dating to this period. This cultural pattern is found throughout the CVP area.

Cultural patterns as reflected in the archaeological record, particularly specialized subsistence practices, became better defined within the last 3,000 years. Along the coast in the Central Valley, archaeological evidence of social stratification and craft specialization is indicated by well-made artifacts such as charm stones and beads, which were often found with burials.

3.3.7.2 History

Initial Euroamerican introduction to the region came in the form of Spanish missionaries and soldiers, who entered California in 1769, eventually founding 21 missions along the California coast. This way of life began to crumble in 1822, with Mexico winning independence from Spain. Between 1822 and 1848, the large tracts of land previously held by the missions were divided by government grants into large ranchos, often consisting of tens of thousands of acres. The owners of these large estancias built homes,

often of adobe, and maintained large herds of cattle and horses. Agricultural during this time was a minor endeavor, usually restricted to garden plots and small vegetable-growing operations.

The Treaty of Guadalupe Hidalgo in 1848 resulted in the transfer of California from Mexico, beginning what is called the American Period in California history. During that same year, gold was discovered in the foothills of the Sierra Nevada and thousands of hopeful miners entered the region. This rush of miners and settlers made the development and improvement of a transportation system a virtual necessity. Between 1850 and 1880, the development of hundreds of primary wagon routes, the evolution of steamboat travel along major rivers, and the completion of numerous railroads occurred. Most of the supply centers and shipment points along these transportation corridors eventually developed into cities, small towns, and settlements.

As settlements grew, agricultural enterprises became more common. During the early years, dryland agriculture predominated. A primary constraint to expansion of crop diversity and areas under cultivation was the lack of water. Irrigation was virtually unknown in California until the 1880s.

After the turn of the century, California settled into a period of slow growth and increased agricultural productivity and prosperity. California came to be viewed as a prime recreational area with the advent of the automobile age and the establishment of many national parks and other attractions. The development of the CVP in the 1940s and the introduction of more sophisticated farming methods boosted California's economic situation.

3.3.7.3 Ethnography Overview

Prior to European settlement of California, an estimated 310,000 native Californians spoke dialects of as many as 80 mutually unintelligible languages. This level of complexity necessitated a high level of multilingualism among the state's native peoples who interacted widely with one another through trade and ceremonial exchanges. Intermarriage across language groups was likewise common.

California's native peoples have been divided by anthropologists into six "culture areas", based on perceived similarities of environments, lifestyles, and material culture: the Northwest, Northeast, Central, and Southern California regions, as well as the Colorado River and Great Basin culture areas. The factors most likely to distinguish one culture area from another are often related to elements of the physical environment.

All native Californians followed a basic hunter-gatherer lifestyle subsisting through a seasonal round of plant collecting, hunting, and fishing. Reliance on particular resources varied with location and season. Archaeological evidence indicates a general evolution over time from subsistence strategies that were based primarily on hunting large game to a broad-based economy that placed greater emphasis on diversity. Along with this diversification came population growth and a more settled way of life.

At the time of first contact with Spanish explorers and settlers, most groups inhabiting California had extremely evolved social, ceremonial, and political structures supported by an elaborate and varied material culture. This was especially true of the Central Sacramento-San Joaquin Valley and Southern Coast-Santa Barbara Channel regions, which were exemplified by the Yokuts and Chumash.

Native Californians were initially devastated by contact with Europeans, because of the advent of new diseases for which they had no immunity and hastened by the loss of their land base. Native culture is experiencing a resurgence today and a revival of traditional practices throughout the state.

3.3.7.4 Ethnography of the Sacramento Valley and San Joaquin Valley

The Maidu, Konkow (also known as northeastern Maidu), and Nisenan (also known as southern Maidu) inhabited an area of California from Lassen Peak to the Cosumnes River, and from the Sacramento River to Honey Lake. The division of these three groups is based on language differences and geographic location. The subsistence strategy of the Maidu was based on seasonally mobile hunting and gathering. Because the Maidu territory was largely a mountainous one, they relied more heavily on hunting than did the other groups. In 1833, a malaria epidemic killed up to 75 percent of the Maidu population. The population reduction from the epidemic left the Maidu, Konkow, and Nisenan unable to resist the overwhelming flood of miners and settlers. Many of the few survivors became wage laborers on mines and ranches, and their language and culture diminished.

The Yana of north-central California inhabited an area from Lassen Peak and the southern Cascade foothills on the east, Rock Creek on the south, Pit River on the north, and the east bank of the Sacramento River on the west. The Yana were hunter-gathers who relied heavily on the acorn crop. The first contact of the Yana with whites may have occurred as early as 1821, when a mission-military expedition entered their territory. Mining and settlement had little effect on the Yana; however, in 1846, Captain Fremont attacked and killed several Yana. The last of the Yana-Yahi people died in San Francisco in 1916.

The Wintu consist of a southern Patwin group, a central (Nomlaki) group, and a northern (Wintu) group. Subsistence for the Wintu and Nomlaki was based on three main staples: deer, acorns, and salmon. The earliest contact of the Wintu and Nomlaki with Euroamericans was probably with hunters, trappers, and explorers during the 1820s and 1830s. A malaria epidemic in 1833 killed an estimated 75 percent of the Sacramento Valley Indians, completely depopulating many Nomlaki and Wintu villages. After the arrival of miners and settlers, the Nomlaki and Wintu suffered further reductions in population and eventually the surviving members were moved to reservations and camps.

The Patwin inhabited the region from Princeton to Benicia. Several of the major settlement areas, particularly those near the Sacramento River and San Francisco Bay resources, were very populous. The growth of missions within California had significant long-term impacts on the Patwin. Introduced diseases, such as measles and smallpox, were instrumental in reducing the Indian population to the point that established cultural traditions and settlement systems could no longer be maintained. The onslaught of Euroamericans during the late 1940s, coupled with the gold rush beginning in 1849, eliminated the Patwin culture. By 1871-1872, the Patwin culture no longer existed.

The “Wappo” is an Anglicized derivation of the Spanish word “guapo”, which was a relatively small Native American group. The Wappo occupied territory that extended from present-day Napa north to the vicinity of Middletown and Geyserville, and also along the southern shore of Clear Lake.

The Achumawi and Atsugewi of northeastern California are two distinct but related groups. Inter-marriage could occur between villages and between the Atsugewi and Achumawi. The Atsugewi probably first came into contact with Euroamericans in 1827-1828. Fighting between settlers and the Atsugewi in the late 1850s resulted in many deaths, and most of the surviving Atsugewi were transported to the Round Valley Reservation.

The Shasta peoples inhabited Shasta Valley, Scotts Valley, and along the Klamath River. Primary subsistence staples were deer and acorns. In the 1820s and 1830s, the Shasta people first came into

contact with Euroamericans who were working as fur trappers in that region. In the 1850s, their population was greatly diminished by the Rogue River Indian wars and by hostilities from miners and settlers. By the 20th century, the Shastan language was virtually extinct, and little of the aboriginal culture remained.

The Yokuts inhabited the San Joaquin Valley and Sierra Nevada foothills of central California. The Yokuts culture consists of three primary divisions: Southern San Joaquin Valley Yokuts, the Northern San Joaquin Valley Yokuts, and the Foothill Yokuts. The Yokuts were seasonally mobile hunter-gatherers with semi-permanent villages. They first came into contact with Europeans in the late 1700s. The loss of individuals to the missions, various epidemics in the 1800s, and the arrival of settlers and miners all contributed to the disintegration of Yokuts culture.

The Miwok includes a large and diverse number of peoples inhabiting coastal and central California. The Miwok were seasonally mobile hunter-gatherers with semi-permanent villages. Acorns were the staple food resource. Early contact between Miwok and Europeans occurred first as early as 1579 in the coastal areas and in inland areas as late as the late 1700s. In the middle to late 1800s, the Miwok were forced from their land, killed, and fell victim to various epidemics because of the arrival of settlers, ranchers, and miners.

The Monache, or Western Mono, are six separate groups who are linguistically affiliated. The Monache lived on the west slopes of the Sierra Nevada. They were seasonally mobile hunter-gatherers. Acorns were their dietary staple. Prior to Euroamerican contact, the areas of the Monache and Yokuts were among the most heavily populated areas in California.

The Tubatulabal lived in the area from Mt. Whitney to the north, Walker Pass to the east, and the San Joaquin Valley to the west. They subsisted by hunting, gathering, and fishing, with pinyon pine nuts and acorns as their staples. First contact with Euroamericans was circa 1850.

The Kitanemuk are thought to have close ties and cultural traits in common with the tubatulabal. The core area of the Kitanemuk people was the Tehachapi Mountains at the southern end of the San Joaquin Valley. It is believed that the Kitanemuk were assimilated into various missions, which effectively destroyed their culture (USBR, 1997).

3.3.7.5 Prehistoric and Historic Sites

Table 3-5 presents a list showing the number of prehistoric and historic sites identified in the counties within the CVP area.

County	Prehistoric Sites	Historic Sites	Themes of Historic Sites
El Dorado	851	256 sites or historic components of the 851 prehistoric sites	Architecture, economic/industrial, exploration/settlement, government, religion, and social/education
Sacramento	435	28 sites or historic components of the 435 prehistoric sites	Aboriginal, architecture, arts/leisure, economic/industrial, exploration/settlement, government, military, religion, and social/education
Colusa	199	84 sites or historic components of the 199 prehistoric sites	Aboriginal, architecture, economic/industrial, exploration/settlement, government, and religion
Glenn	474	101 sites or historic components of the 474 prehistoric sites	Economic/industrial, exploration/settlement, and government
Shasta	2,104	721 sites or historic components of the 2,104 prehistoric sites	Aboriginal, architecture, economic/industrial, exploration/settlement, military, religion, and social/education
Tehama	1,615	200 sites or historic components of the 1,615 prehistoric sites	Architecture, economic/industrial, exploration/settlement, government, military, religion, and social/education
Yolo	181	6 sites or historic components of the 181 prehistoric sites	Architecture, arts/leisure, economic/industrial, exploration/settlement, government, religion, and social/education
Fresno	2,891	288 sites or historic components of the 2,891 prehistoric sites	Architecture, arts/leisure, economic/industrial, exploration/settlement, military, religion, and social/education
Merced	341	25 sites or historic components of the 341 prehistoric sites	Aboriginal, architecture, economic/industrial, exploration/settlement, government, and religion
San Joaquin	249	60 sites or historic components of the 249 prehistoric sites	Architecture, economic/industrial, exploration/settlement, military, religion, and social/education
Stanislaus	350	70 sites or historic components of the 350 prehistoric sites	Aboriginal, economic/industrial, and exploration/settlement

3.3.8 Land Use

City and county planning authorities regulate land planning and land development activities within boundaries of CVP water contractor service areas. Each county or city general plan identifies the land use designation and describes the land use intentions for particular areas and parcels of land.

Because each county or city land planning authority operates independently, land use designations range in scope from specific (allowable activities, intensity, or density) to broad (the county's general intentions for the land use). The county-designated land uses for each of the CVP water contractors affected by Reclamation's CPOU petition are described in Section 3.4.

Land uses within the boundaries of each water contractor service area are managed by the county or city having jurisdiction over land use decisions in that area. Generally, CVP water contractors do not have jurisdiction over land use, except when the water contractor is the county or a municipal entity. CVP water contractors normally have only decision making authority regarding issues associated with the boundaries of their service areas and the installation, construction, and operation of facilities and equipment needed to supply water users. In some instances, a CVP water contractor, such as the Santa Clara Valley Water District (SCVWD), is a wholesaler of M&I water in Santa Clara County. SCVWD provides water to municipal and private water companies that have the decision making authority regarding their retail service areas and the facilities needed to supply water to the retail water customers.

Reclamation does not have authority over land use activities within the service area boundaries of the water contractors, except for ensuring compliance with water delivery contract terms that specify the type of use for which CVP water is being delivered.

Of the encroachment area, 56,543 acres are in agricultural land uses, and 60,121 acres are in municipal and industrial land uses. Of the expansion area, 32,696 acres are in agricultural land uses, 1,914 acres are in municipal and industrial land uses, and 683,393 acres are undeveloped lands.

3.3.9 Recreation and Visual Resources

3.3.9.1 Recreational Resources of Lands Outside the Authorized POU and Water Features

Recreational resources can be separated into two categories: recreational opportunities associated with reservoirs and rivers, and recreational opportunities associated with lands outside the authorized POU.

Recreational opportunities associated with reservoirs and rivers include (1) water-dependent recreational activities such as swimming, boating, rafting, and fishing; and (2) water-enhanced recreation activities such as picnicking, camping, hiking, photography, and sightseeing. Recreational opportunities associated with lands outside the authorized POU include municipal recreational resources consisting of developed parks and facilities designed to provide an organized recreational experience, and dispersed recreational opportunities, such as hiking, hunting, and other activities associated with open space that are allowed on undeveloped lands.

Recreational resources are widely distributed throughout the authorized POU. Water features providing recreational opportunities that have the potential to be affected by operational changes resulting from Reclamation's CPOU petition include Shasta Lake, Whiskeytown Lake, Clair Engle Reservoir, Folsom Reservoir, San Luis Reservoir, American River, Sacramento River, and the Sacramento-San Joaquin Delta. Recreational opportunities on municipal or undeveloped lands throughout the authorized POU consist of national, community, or private recreation areas; wildlife refuges; river accesses; and golf courses.

3.3.9.2 Visual Resources of Lands Outside the Authorized POU and Water Features

The visual quality of lands outside the authorized POU and water features varies because of the relative distance from urban and undeveloped areas; the topography, and complexity of the landscape; the current and historical land uses of the affected lands; and viewers' sensitivity to visual change. A general summary of the visual quality of lands outside the authorized POU is provided below by land use type.

Agricultural lands, usually located on gentler slopes, often cannot be viewed from distant locations, and are typically near or adjacent to other agricultural lands. Although agricultural practices alter the visual character of the landscape by creating expansive acreage of similar color, landform, line, and texture, the associated pastoral setting often contrasts less with the adjacent agricultural landscape than with different land use activities. Irrigated agriculture and dryland agriculture, although substantially different in agricultural practices and cropping patterns, have similar visual characteristics.

Municipal and industrial lands outside the authorized POU vary considerably in character. Municipal land uses consist of rural residential development, small communities, or larger urban environments. Industrial uses may range from isolated industrial facilities associated with agricultural production to large oil well fields or densely concentrated industrial complexes within urban centers. Each of these areas retains an individual visual quality that is associated with its use.

In many cases, rural residential areas are assigned a high visual quality if the area provides a diverse combination of the human-made and natural environments. Viewers often assign a high aesthetic value where this diversity creates a complex landscape with components that complement each other. In areas where dense concentrations of industrial development dominate the landscape and are accompanied by noise and odor, viewers tend to assign a low aesthetic value.

Lands with native vegetation, undisturbed surfaces, changes in topography, or a location near water features typically provide the greatest variety of color, form, line, and texture. In areas where vegetation is diverse, color, form, line, and texture are rated high. In areas dominated by grassland or savannah vegetation types, form and texture create the most dominant visual components. Undeveloped lands exhibit a wide variety in form, seasonal variation in vegetative cover, and distribution of vegetation.

3.3.10 Economics

The CVP contractors affected by Reclamation's CPOU petition are distributed throughout 18 counties. Because the contractors are scattered throughout such a large area, socioeconomic information was compiled on a countywide basis (Table 3-6).

Table 3-6 Economic Characteristics of Counties with CVP Water Contractors with Land Outside the POU		
County	CVP Water Contractor	Economic Characteristics
Alameda County	East Bay Municipal Utility District	Heavy industry, manufacturing, computer services, and biotechnology are some of the important industries in the county. The Dublin, Pleasanton, and Livermore Valley areas once exhibited agricultural and rural characteristics, but is transforming into a residential, commercial, and industrial part of Alameda County. Services provide 26 percent of the jobs; government provides 21 percent; retail trade provides 16 percent; manufacturing provides 14 percent; and mining and construction, transportation, utilities, finance, and wholesale trade all contribute minor amounts of employment opportunities in the county (Employment Development Department, 1994a).
Colusa County	Colusa County Water District, Glenn Valley Water District, and Westside Water District	Agriculture has been its primary industry since the 1850s. In 1980, approximately 40 percent of the wage and salary employees were engaged in farming activities (University of California, 1982). Nonagricultural employment primarily consists of retail trade and government services (Employment Development Department, 1989a).
Contra Costa County	Contra Costa Water District and East Bay Municipal Utility District	The County's principal industries are petroleum refining and manufacturing, although agriculture is still a significant source of income. Agricultural uses occupy about 50 percent of the area in the county, with commercial agricultural acreage generally located in the eastern portion of the county and the western area highly urbanized (University of California, 1982).
Fresno County	City of Avenal, City of Coalinga and its associated service area, San Luis Water District, and Westlands Water District	Two-thirds of the county remains in a natural or semi-natural condition; the remaining one-third is extensively developed for agriculture and industry. Agriculture in the county generates over \$1 billion annually. Since 1950, the county has ranked as the first county in the United States in terms of annual gross value of agricultural production (University of California, 1982).
Glenn County	Kanawha Water District and Orland-Artois Water District	Timber production contributes to the local economy with lumber from pine, fir, and cedar. Cattle and sheep production are an important part of the county's agriculture; however, field crops are the most important agricultural product (University of California, 1982).
Kern County	Arvin-Edison Water Storage District	Agriculture and oil have been the economic base for Kern County since the early 1900s. In 1979, 20 percent of the county's wage and salary employment was generated by agriculture (University of California, 1982).
Kings County	City of Avenal and Westlands Water District	Kings County is primarily farmland; over 85 percent of the land area is in farms. Agriculture is the county's single most important industry. Approximately 33 percent of the wage and salary employees in Kings County were employed in agriculture in 1979; government was the next largest employer (23 percent) (University of California, 1982).
El Dorado County	El Dorado Irrigation District	Tourism is the county's economic base. More than 50 percent of the employment in the county in recent years has been in services, retail trade, and government (the industries that provide most of the tourism-related services to the region's visitors) (Employment Development Department, 1992).
Merced County	Del Puerto Water District and San Luis Water District	About 27 percent of the land area in the county is harvested cropland; approximately 45 percent of the county area is unirrigated rangeland. Livestock industries are very important in Merced County, with dairying, beef cattle, and poultry producing the greatest gross revenues. In addition, some crops, such as almonds, cotton, and alfalfa, are grown (University of California, 1982).

<p align="center">Table 3-6 Economic Characteristics of Counties with CVP Water Contractors with Land Outside the POU</p>		
County	CVP Water Contractor	Economic Characteristics
Sacramento County	El Dorado Irrigation District and Sacramento Municipal Utility District	Sacramento County has a fairly diversified economy. Trade and services provide more than 40 percent of all of the jobs, and government provides another 33 percent (Employment Development Department, 1989b). Sacramento is the center of state government, the county seat, the service center for the northern Central Valley, and a processing center for agricultural products. In addition, two major military installations currently subject to closure actions, McClellan and Mather Air Force Bases, are located within its boundaries. Harvested cropland makes up about 28 percent of the total land area; unirrigated rangeland occupies about 27 percent. Extensive residential and commercial development has contributed to some decline in agricultural land use (University of California, 1982).
San Benito County	San Benito County Water District and Santa Clara Valley Water District	San Benito County is an agriculturally oriented county, with approximately 40 percent of employment accounted for by agriculture. Cattle are also raised in the county, although gross income produced from livestock and their products is less than that from cultivated crops (University of California, 1982).
San Joaquin County	Del Puerto Water District	Crops, livestock, and poultry are the mainstays of the agricultural economy and contribute to the county's ranking among the state's top 10 counties in gross farm receipts. The county is a leading agricultural producer, but it is undergoing a transformation to a more industrial and service economy (Sedway Cooke Associates, 1989). Agriculture employed 15 percent of the wage and salary employees in 1980. Principal nonagricultural sources of employment were wholesale and retail trade, government, services, and manufacturing (University of California, 1982).
Santa Clara County	San Benito County Water District and Santa Clara Valley Water District	Santa Clara County is one of the leading areas in the state for light industry. Manufacturing is the county's largest employer, accounting for over one-third of the wage and salary employment. Agricultural trends toward fruits, vegetables, nuts, poultry, and dairy products have either disappeared or declined, and more intensive uses, such as nurseries or seed crops, have been initiated (University of California, 1982).
Santa Cruz County	San Benito County Water District	Two-thirds of the county is considered forest land by the U.S. Department of Agriculture. Santa Cruz County is known as a vacation and recreation area. Several state parks and state beaches are located within the county. The southern portion of the county is a productive agricultural district. Food canning and freezing industries are located in or near Watsonville. Electronics-related, manufacturing, computer services, and educational services industries are scattered throughout the county. Services provide 28 percent of the jobs; retail trade provides 22 percent; government provides 20 percent; manufacturing provides 15 percent; and mining and construction, transportation, public utilities, finance, and wholesale trade all contribute minor amounts of employment opportunities in the county (Employment Development Department, 1994b).
Shasta County	Anderson-Cottonwood Irrigation District, Bella Vista Water District, Mountain Gate Community Services District, Shasta County Service area No. 6—Jones Valley, Shasta County Service Area No. 25—Keswick, Shasta Community Services District, City of Shasta Lake, and Silverthorn Summer Homes, Inc.	Nearly half of the county land area is classified as commercial forestland; therefore, lumbering is a primary economic activity. In addition, agriculture and livestock grazing are found within the county (University of California, 1982).
Stanislaus County	Del Puerto Water District	Dairy products are the most important source of agricultural revenue. The county is an important agricultural processing center and also has several manufacturing plants (University of California, 1982).
Tehama	Anderson Cottonwood Irrigation District and Corning Water	Agriculture is the major focus of Tehama County's economic base (Tehama County, 1983). Timber products contribute significantly to Tehama County's

County	CVP Water Contractor	Economic Characteristics
County	District	economy. Sheep and cattle raising, olive processing and packing, nut production, and rangeland forage are also important in the county.
Yolo County	Colusa County Water District	Yolo County's economy is primarily agricultural, with a relatively high number of jobs based on activities relating to the production or processing of farm products. Nonagricultural employment includes primarily state and local government and retail trade (Employment Development Department, 1989c).

3.4 Environmental Setting Within the CVP Water Contractor Service Areas

This section describes the environmental setting of areas outside the authorized POU that are within the contract service area boundaries of the 26 CVP water contractors. This information supplements the general environmental setting discussion previously presented, and provides a more detailed description of environmental conditions within each CVP water contractor service area that would be affected by the Proposed Project and alternatives.

Table 3-7 summarizes the existing land uses on encroachment lands (lands that have received CVP water) and expansion lands (lands that have never received CVP water) in the 26 CVP water contractor service areas.

CVP Water Contractor	Total Acreage	Encroachment Lands				Expansion Lands		
		CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I	AG	M&I	Native Veg.
Anderson-Cottonwood Irrigation District	230	0	0	0	0	230	0	0
Arvin-Edison Water Storage District	3,847	0	820	0	1,281	0	0	1,746
Avenal, City of	34,690	0	0	0	3,124	6,347	0	25,219
Bella Vista Water District	1,281	0	0	0	1,021	0	0	260
Coalinga, City of	92,007	0	0	0	4,674	23,401	0	63,932
Colusa County Water District	2,147	0	1,499	0	0	0	0	648
Contra Costa Water District	1,031	0	0	0	0	0	0	1,031
Corning Water District	2,034	0	1,647	0	0	0	0	387
Del Puerto Water	1,000	0	808	0	0	192	0	0

CVP Water Contractor	Total Acreage	Encroachment Lands				Expansion Lands		
		CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I	AG	M&I	Native Veg.
District								
East Bay Municipal Utility District	1,494	0	0	0	0	0	1,494	0
El Dorado Irrigation District	23,578	0	0	0	18,495	0	0	5,083
Glenn Valley Water District	248	0	0	0	0	118	0	130
Kanawha Water District	902	689	0	0	0	0	0	213
Mountain Gate Community Services District	3,992	0	0	0	1,406	0	0	2,586
Orland-Artois Water District	111	0	111	0	0	0	0	0
Sacramento Municipal Utility District	2,830	0	0	2,830	0	0	0	0
San Benito County Water District	5,107	0	2,564	0	0	1,973	420	150
San Luis Water District	9,609	0	9,609	0	0	0	0	0
Santa Clara Valley Water District	592,988	0	2,171	0	25,498	0	0	565,319
Shasta Community Services District	51	0	0	0	0	0	0	51
Shasta County Service Area No. 6 - Jones Valley	1,171	0	0	0	668	0	0	503
Shasta County Service Area No. 25 - Keswick	3,635	0	0	0	918	0	0	2,717
Shasta Lake, City of	231	0	0	0	118	0	0	113
Silverthorn Summer Homes, Inc.	55	0	0	55	0	0	0	0
Westlands Water District	49,401	36,386	0	33	0	250	0	12,732
Westside Water District	997	0	239	0	0	185	0	573
TOTAL	834,667^a	37,075	19,468	2,918	57,203	32,696	1,914	683,393

^aThe sum of the total acreages for each water contractor does not equal the 834,667 total acreage because the City of Avenal's and Westlands Water District's boundaries overlap by 42 acres, and the City of Coalinga's and Westlands Water District's boundaries overlap by 7,160 acres.

As shown, encroachment lands are divided into three categories consisting of:

- CVP-Induced Agriculture - Lands that were not developed for agricultural use prior to the introduction of CVP water supplies.
- Non-CVP Agriculture - Lands that were developed for agricultural use prior to the introduction of CVP water supplies.
- M&I - Lands that were developed for M&I land uses, which have been addressed by local land management agencies in accordance with CEQA.

Table 3-7 also lists expansion lands divided into three categories that describe their current land use (agricultural [AG], M&I, and native vegetation [NV]). As indicated above, none of the expansion lands currently receive CVP water supplies.

3.4.1 Anderson-Cottonwood Irrigation District

Anderson-Cottonwood Irrigation District (ACID) entered into a long-term water service contract (No. 14-06-200-3346A) with Reclamation for CVP water delivery on June 6, 1967.

3.4.1.1 General Description and Location

ACID is located near the northern boundary of the Sacramento Valley, south of the City of Redding. The ACID service area covers 33,240 acres. Of this total, about 230 acres are located outside the authorized POU. These lands are shown in Figure 3-2.

3.4.1.2 Land Use and Land Use Policies

The ACID service area is located within unincorporated lands of Shasta and Tehama counties. The two County General Plans designate these lands for agricultural, rural residential, and open space. The Shasta County General Plan also allows urban, commercial, and industrial land uses within the CVP contract service area. All of the 230 acres are expansion lands that are currently irrigated agriculture.

The irrigated land in the ACID contract service area consists primarily of pasture and forage crops. It is estimated that about 113 acres are used for these crops, with the remainder used to grow fruits and nuts, vegetables, cereal grains, and other field crops.

3.4.1.3 Geology and Soils

ACID is located on alluvial deposits composed of terraces, floodplains, and valley bottoms. Soils consist of primarily clay loams and recent alluvial deposits on stream terraces. These soils have moderate agricultural capabilities that are sometimes limited by permeability rates.

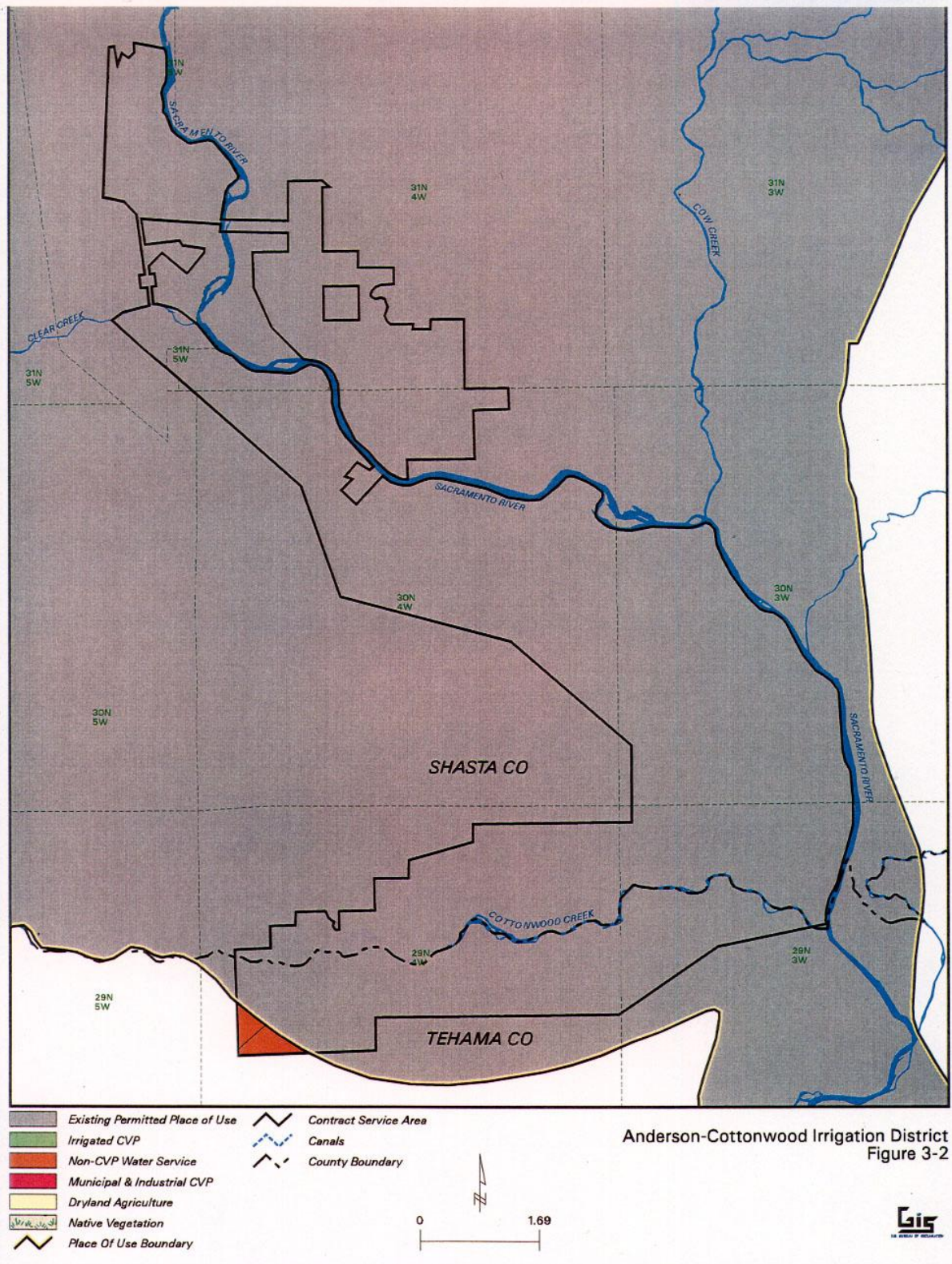
3.4.1.4 Water Resources and Water Use

ACID has a contract for the delivery of 10,000 acre-feet of CVP water. CVP water can only be used for agricultural purposes consistent with the CVP contract terms.

No CVP water is currently delivered to lands outside the authorized POU. The source of water for those lands currently irrigated outside the authorized POU is either groundwater or water pursuant to ACID's pre-1914 water right. Some individuals residing within the ACID boundary also have installed groundwater wells to support domestic land uses.

3.4.1.5 Groundwater Resources

ACID lands outside the authorized POU have access to an unknown amount of water from private groundwater wells. However, the quantity of groundwater appears to be limited. There is no indication that groundwater use in this region would be restricted by water quality.



3.4.1.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-8 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 18 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	0	121	121
Valley-foothill riparian/fresh emergent wetland	0	0	0	0	5	5
Annual grassland	0	0	0	0	104	104
TOTAL	0	0	0	0	230	230

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Of the species listed in Table D-2, the species in Table 3-9 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the California Natural Diversity Database (CNDDDB), no special-status species have been observed on lands within the ACID CVP contract service area outside the authorized POU.

3.4.1.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering prehistoric sites.

Habitat	Species	Status
Valley-foothill riparian/fresh emergent wetland	Valley elderberry longhorn beetle	State: -- Federal: Threatened
Valley-foothill riparian/fresh emergent wetland	California red-legged frog	State: Species of Special Concern Federal: Threatened
Annual grassland	Vernal pool fairy shrimp	State: -- Federal: Threatened
Annual grassland	Vernal pool tadpole shrimp	State: -- Federal: Endangered
Annual grassland	Conservancy fairy shrimp	State: -- Federal: Endangered
Fresh emergent wetland	Bogg's Lake hedge-hyssop	State: Endangered Federal: --
Species listed are in accordance with the state and federal Endangered Species Acts.		

3.4.2 Arvin-Edison Water Storage District

Arvin-Edison Water Storage District (Arvin-Edison) entered into a long-term water service contract (No. 14-06-200-229A) with Reclamation for CVP water delivery on August 30, 1962, and it was amended on February 27, 1968. Arvin-Edison's original water service contract expired on February 28, 1995. That contract was renewed for an interim period of 3 years effective February 27, 1995 (No. 14-06-200-229A-IR1).

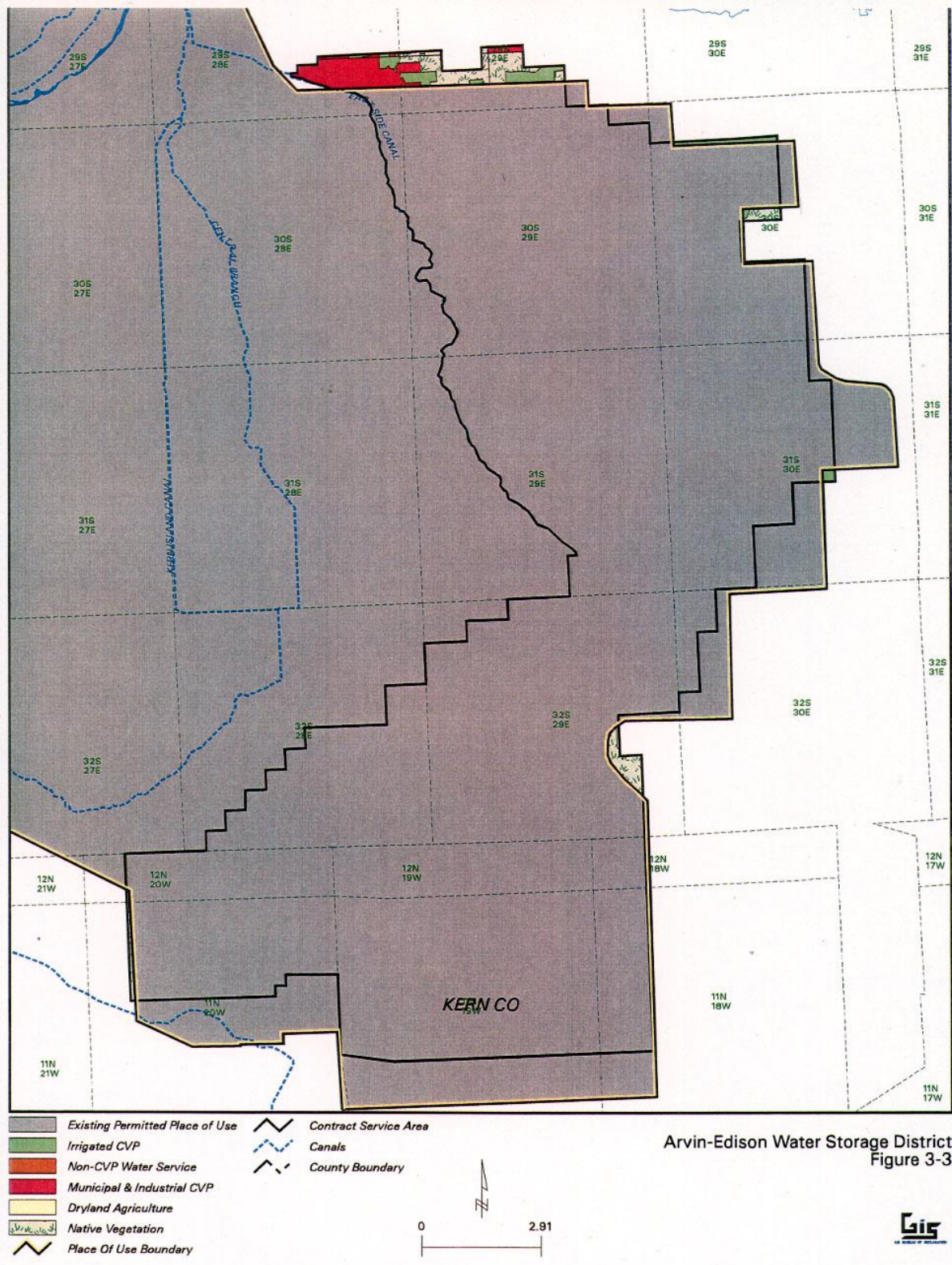
3.4.2.1 General Description and Location

Arvin-Edison is located near the southern boundary of the San Joaquin Valley, just southeast of Bakersfield. The Arvin-Edison service area covers 132,848 acres. Of this total, about 3,847 acres are located outside the authorized POU. These lands are shown in Figure 3-3.

3.4.2.2 Land Use and Land Use Policies

The Arvin-Edison service area is located within unincorporated lands of Kern County. The County General Plan designates these lands for primarily agricultural and M&I uses. The County General Plan also allows mineral and petroleum extraction uses within the CVP contract service area.

Of the 3,847 acres located outside the authorized POU, 2,101 acres are encroachment lands and 1,746 acres are expansion lands. 820 acres are in an irrigated agricultural land use, 1,281 acres correspond to a municipal/industrial land use, and the remaining 1,746 acres are undeveloped and support native vegetation. Prior to the mid-1960s, the agricultural land outside the authorized POU was dryland farmed. The irrigated land in Arvin-Edison's contract service area supports primarily oranges and grapes. Arvin-Edison's surface water service area includes 52,716 acres, and 78,944 acres are included in the groundwater service area.



Arvin-Edison Water Storage District
Figure 3-3

3.4.2.3 Geology and Soils

The majority of Arvin-Edison is comprised of alluvial fans and plains, basin rims, terraces, and floodplains. The soils associated with these areas are primarily well-drained sandy loams, silt loam, and clay loam (USDA, 1988).

3.4.2.4 Water Resources and Water Use

Arvin-Edison has a contract for the delivery of 40,000 acre-feet of firm (Class 1) water; an additional 311,675 acre-feet of non-firm (Class 2) water is available on an erratic basis. CVP water use is restricted to agricultural and M&I purposes consistent with the CVP contract terms. Arvin-Edison historically has been delivered on the average 171,000 acre-feet of water per year.

Arvin-Edison has made water deliveries from a variety of sources over the last 30 years, including but not limited to, the CVP-Friant-Kern Canal, the Cross Valley Canal, and non-CVP water from the Kern River or the local groundwater basin.

Arvin-Edison historically has regulated its erratic Friant-Kern supply through its conjunctive use program and its exchange program. The exchange program involves delivering a portion of its Friant supply to exchange contractors along the Friant-Kern Canal and taking delivery of exchanger's westside CVP supply through the Cross Valley Canal.

3.4.2.5 Groundwater Resources

Arvin-Edison uses surface water on lands outside the authorized POU and also has a groundwater program that allows delivery through canals to the areas outside the local authorized POU.

Arvin-Edison's conjunctive use program involves storing wet-year imported water in excess of coincident irrigation demand in two spreading basins that have associated wellfields and extracting stored water in dry years for delivery to the surface water service area.

During dry years, deliveries consist of a blend of surface water and stored water extracted from its wellfields. Growers in the groundwater service area benefit from in-lieu recharge in the surface water service area and from water stored in the two spreading basins.

3.4.2.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-10 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill riparian/fresh emergent wetland	0	3	0	0	11	14
Alkali scrub	0	181	0	0	96	277
Annual grassland	0	636	0	1,281	1,639	3,556
TOTAL	0	820	0	1,281	1,746	3,847

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 24 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-11 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Habitat	Species	Status
Alkali scrub	Blunt-nosed leopard lizard	State: Endangered Federal: Endangered
Alkali scrub	Tipton kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub	San Joaquin kit fox	State: Threatened Federal: Endangered
Alkali scrub Annual grassland	Hoover's eriastrum	State: -- Federal: Threatened
Alkali scrub Annual grassland	San Joaquin woolly-threads	State: -- Federal: Endangered
Alkali scrub Annual grassland	California jewelflower	State: Endangered Federal: Endangered
Annual grassland	San Joaquin adobe sunburst	State: Endangered Federal: Endangered
Valley-foothill riparian/fresh emergent wetland	Striped adobe lily	State: Threatened Federal: Proposed Threatened
Valley-foothill riparian/fresh emergent wetland	Western yellow-billed cuckoo	State: Endangered Federal: --

Species listed are in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, the San Joaquin woolly-threads, California jewelflower, Vasek's clarkia, and Bakersfield cactus have been observed on lands within the CVP contract service area outside the POU.

3.4.2.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a moderate to high archaeological sensitivity with a high probability of encountering one to five prehistoric sites containing historic-era sites or features.

3.4.3 City of Avenal

The City of Avenal (Avenal) entered into a long-term water service contract (No. 14-06-200-4619A) with Reclamation for CVP water delivery on November 20, 1969. Avenal began delivery of the M&I water in March 1972.

3.4.3.1 General Description and Location

Avenal is located near the southern boundary of the San Joaquin Valley. The Avenal service area covers 46,871 acres. Of this total, about 34,732 acres are located outside the authorized POU. These lands are shown in Figure 3-4.

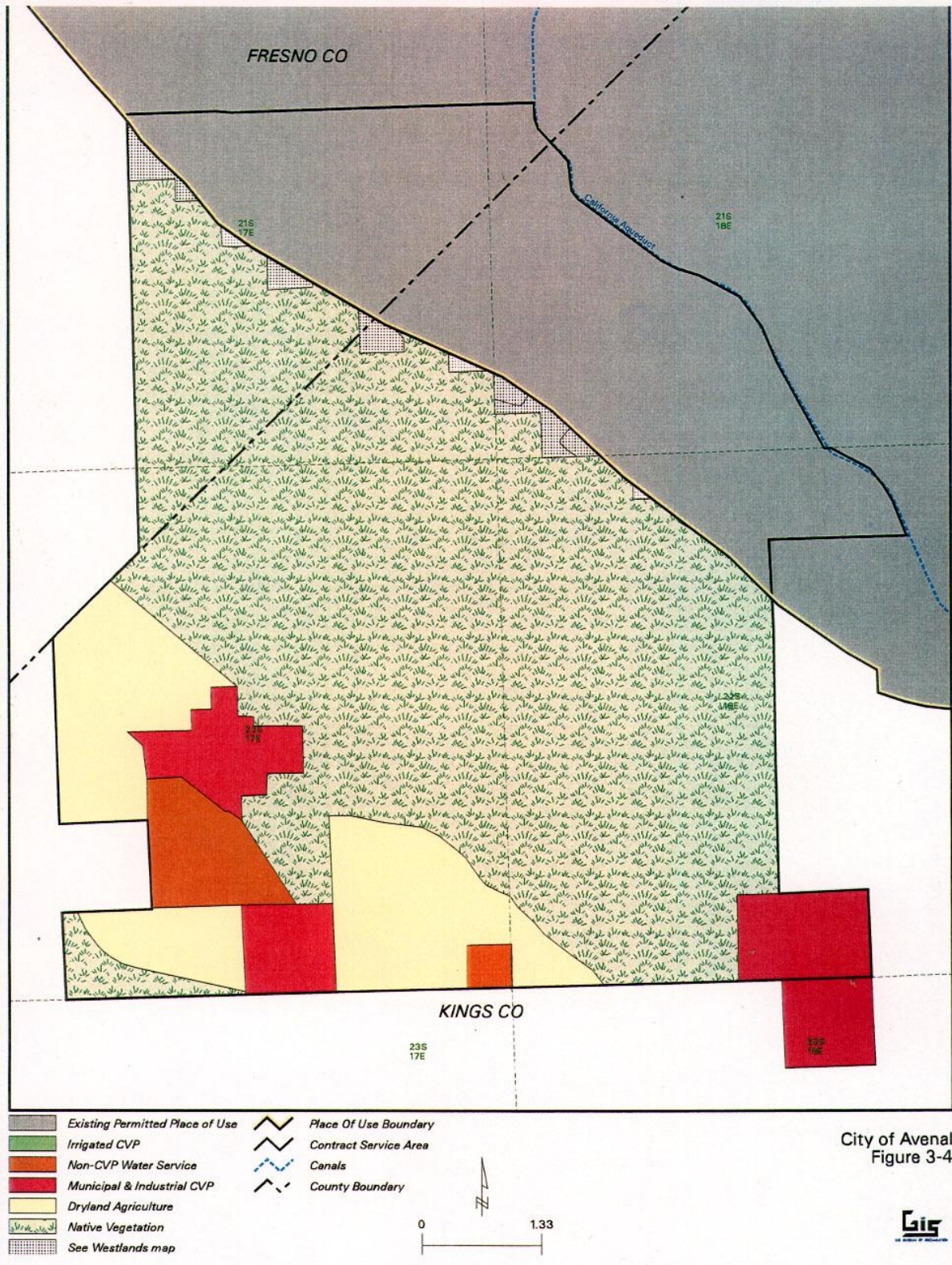
3.4.3.2 Land Use and Land Use Policies

The Avenal service area is located within incorporated lands of the City of Avenal, as well as within the unincorporated lands of Kings and Fresno counties. The Kings County General Plan designates these lands for primarily agricultural and M&I uses, and also allows mineral resources, public lands, and open space uses within the CVP contract service area. The Fresno County General Plan allows mineral resources and flood zone land uses.

Avenal covers 19.5 square miles. Outside the city, land is used primarily for farming, oil and gas extraction, and grazing. The irrigated land in this service area was developed and is being farmed with non-CVP water except for small areas along the northeast boundaries of the service area. Those small areas that receive CVP water for irrigation obtain the water through a contract with Westlands Water District and are addressed in Section 3.4.25 of this EIR.

The Avenal contract service area includes a state prison, a Pacific Gas and Electric (PG&E) gas compressor station, and a chemical waste treatment facility.

Of the 34,732 acres located outside the authorized POU, 3,124 acres are encroachment lands and 31,566 acres are expansion lands. 6,347 acres are in an irrigated or dryland agricultural land use that do not use CVP water; 3,124 acres correspond to an M&I land use; 25,219 acres are undeveloped and support native vegetation; and about 42 acres are in both the City of Avenal and Westlands Water District service areas. The land use of the 42 acres is undeveloped, supporting native vegetation.



City of Avenal
Figure 3-4

These overlapping lands are included in the discussion of Westlands Water District acreages presented in Section 3.4.25 in this EIR.

3.4.3.3 Geology and Soils

The majority of the Avenal area is a mixture of alluvial fans, floodplains, and terraces. Soils of alluvial fans and floodplains are usually deep, well-drained, non-saline, and non-alkali. Soils of terraces with dense clay subsoils have problems because of shallow depth, low fertility, and available moisture-holding capacity. High terraces are well-drained, non-saline, non-alkali, and medium-textured soils with dense clay subsoils (USDA, 1973).

3.4.3.4 Water Resources and Water Use

Avenal has a contract for the delivery of 3,500 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. Avenal has historically used up to its full contract amount.

CVP water is delivered mainly within Avenal and to the state prison. The town was developed and thrived for many years on water supplied by sources other than CVP. The local groundwater is not potable. Prior to CVP deliveries, water was delivered to Avenal from Kettleman City.

In 1994, Avenal's water distribution in the contract service area included 807 acre-feet for the city, 932 acre-feet for the state prison, 28 acre-feet for the Interstate-5 (I-5) rest stop, 10 acre-feet for the PG&E compressor station, 52 acre-feet for the chemical waste facility, and 59 acre-feet for domestic deliveries outside the city limits.

3.4.3.5 Groundwater Resources

Avenal lands located outside the authorized POU are currently supplied, in part, by an unspecified amount of groundwater. However, because of current rates of groundwater overdraft in this region, this source is not considered to be an available long-term supply. There is no indication that groundwater use would be limited by water quality issues.

3.4.3.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-12 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 21 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agric.	CVP-Induced M&I	Non-CVP-Induced M&I		
Alkali scrub	0	0	0	644	866	1,510
Annual grassland	0	0	0	2,455	30,235	32,690
Valley-foothill riparian/fresh emergent wetland	0	0	0	25	465	490
TOTAL	0	0	0	3,124	31,566^b	34,690

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

^bThis total does not include the 42 acres of habitat that overlap with Westlands Water District. The habitats of the 42 acres are included in Table 3-43.

Of the species listed in Table D-2, the species in Table 3-13 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Habitat	Species	Status
Alkali scrub	Blunt-nosed leopard lizard	State: Endangered Federal: Endangered
Annual grassland Fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Alkali scrub	Fresno kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	California jewelflower	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin woolly-threads	State: -- Federal: Endangered
Alkali scrub Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Alkali scrub Annual grassland	San Joaquin antelope squirrel	State: Threatened Federal: Species of Concern

Species listed are in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, the blunt-nosed leopard lizard, San Joaquin antelope squirrel, San Joaquin pocket mouse, burrowing owl, and San Joaquin woolly-threads have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.3.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a low archaeological sensitivity with a low probability of encountering prehistoric sites.

3.4.4 Bella Vista Water District

Bella Vista Water District (BVWD) entered into a long-term water service contract (No. 14-06-200-851A) with Reclamation for CVP water delivery on April 3, 1964. BVWD's original water service contract expired on December 31, 1994. That contract was renewed for an interim period of 3 years effective January 1, 1995 (No. 14-06-200-851A-IR1).

3.4.4.1 General Description and Location

BVWD is located near the northern boundary of the Sacramento Valley, northeast of the City of Redding. The BVWD service area covers 33,813 acres. Of this total, about 1,281 acres are located outside the authorized POU. These lands are shown in Figure 3-5.

3.4.4.2 Land Use and Land Use Policies

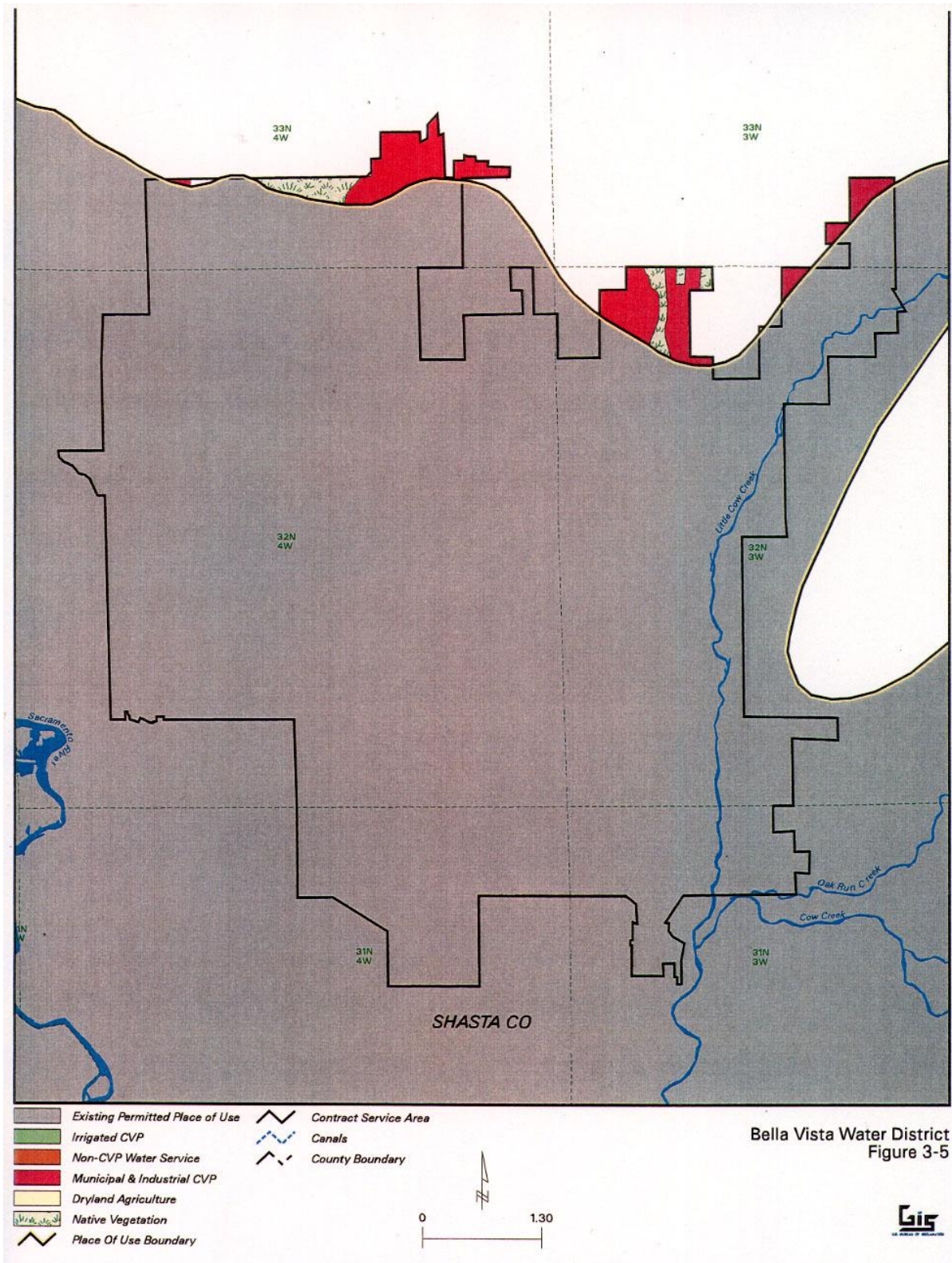
The BVWD service area is located within unincorporated lands of Shasta County. The County General Plan designates these lands for primarily rural residential uses. The County General Plan also allows agricultural grazing uses within the CVP contract service area.

Of the 1,281 acres located outside the authorized POU, 1,021 acres are encroachment lands and 260 acres are expansion lands.

Only 308 acres of the area outside the authorized POU were added since BVWD's formation in 1964. Two acres are currently idle, 10 acres are Class 6 lands, and the remaining 296 acres have approximately 31 rural residences using approximately 22 acre-feet of CVP water since 1986 and 1987.

The remaining 973 acres outside the authorized POU were part of the original BVWD service area. About 170 acres were historically cultivated, using a non-CVP source, of which 90 acres currently receive approximately 397 acre-feet of CVP water. The remaining acreage is idle or natural habitat. Approximately 39 rural residences use 28 acre-feet of CVP water annually.

The contract service area includes two colleges, which use both irrigation and M&I water, and approximately 27 users that use 20 acre-feet of CVP water annually. BVWD contains many small rural residences, ranging from 1 to 40 acres, that receive both agricultural and M&I CVP water used for irrigation, domestic purposes, and pasture. BVWD has five wells that supply approximately 798 acre-feet of water for M&I purposes and 506 acre-feet of water for irrigation annually. There are no plans for any major residential development. The irrigated land in BVWD's contract service area is used primarily to grow forage crops, with the remainder used to grow cereal grains, deciduous orchards, and other field crops.



3.4.4.3 Geology and Soils

The majority of BVWD's service area is alluvial valley deposits; however, BVWD extends into areas composed of foothill materials and soils. Valley soil types consist of well-drained clay loams, and the foothill soil types consist of well-drained to excessively-drained sandy loams.

3.4.4.4 Water Resources and Water Use

BVWD has a contract for up to 24,000 acre-feet of CVP water for irrigation and/or M&I uses. CVP water is delivered to BVWD at the Wintu Pumping Plant located on the Sacramento River, near the City of Redding. CVP water and groundwater are BVWD's sources of water supply.

Prior to the introduction of CVP water supplies, 334 acres of land received other sources of water. BVWD has historically used up to 23,993 acre-feet of water per year.

CVP water is delivered mainly to support rural residential land uses, including the irrigation of lands associated with local development. The volume of CVP water currently delivered outside the authorized POU is approximately 447 acre-feet.

Prior to receiving CVP water, the lands were supplied from marginal groundwater extractions.

3.4.4.5 Groundwater Resources

BVWD lands outside the authorized POU have access to an unspecified amount of water from private groundwater wells as an alternative to receiving CVP water. However, this water is of limited quantity and is not expected to be sufficient to meet existing water supply requirements. The groundwater appears to be of adequate quality for agricultural, industrial, and municipal uses.

3.4.4.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by four vegetative community/habitat types. Table 3-14 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 13 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, two species (the valley elderberry longhorn beetle and the California red-legged frog) are designated as threatened in accordance with the federal Endangered Species Act.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	88	22	110
Valley-foothill riparian/fresh emergent wetland	0	0	0	26	6	32
Mixed chaparral	0	0	0	496	106	602
Annual grassland	0	0	0	411	126	537
TOTAL	0	0	0	1,021	260	1,281

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Based on a review of the CNDDB, the silky cryptantha (a special-status species) has been observed on lands within the CVP contract service area outside the authorized POU.

3.4.4.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites containing historic-era sites or features.

3.4.5 City of Coalinga

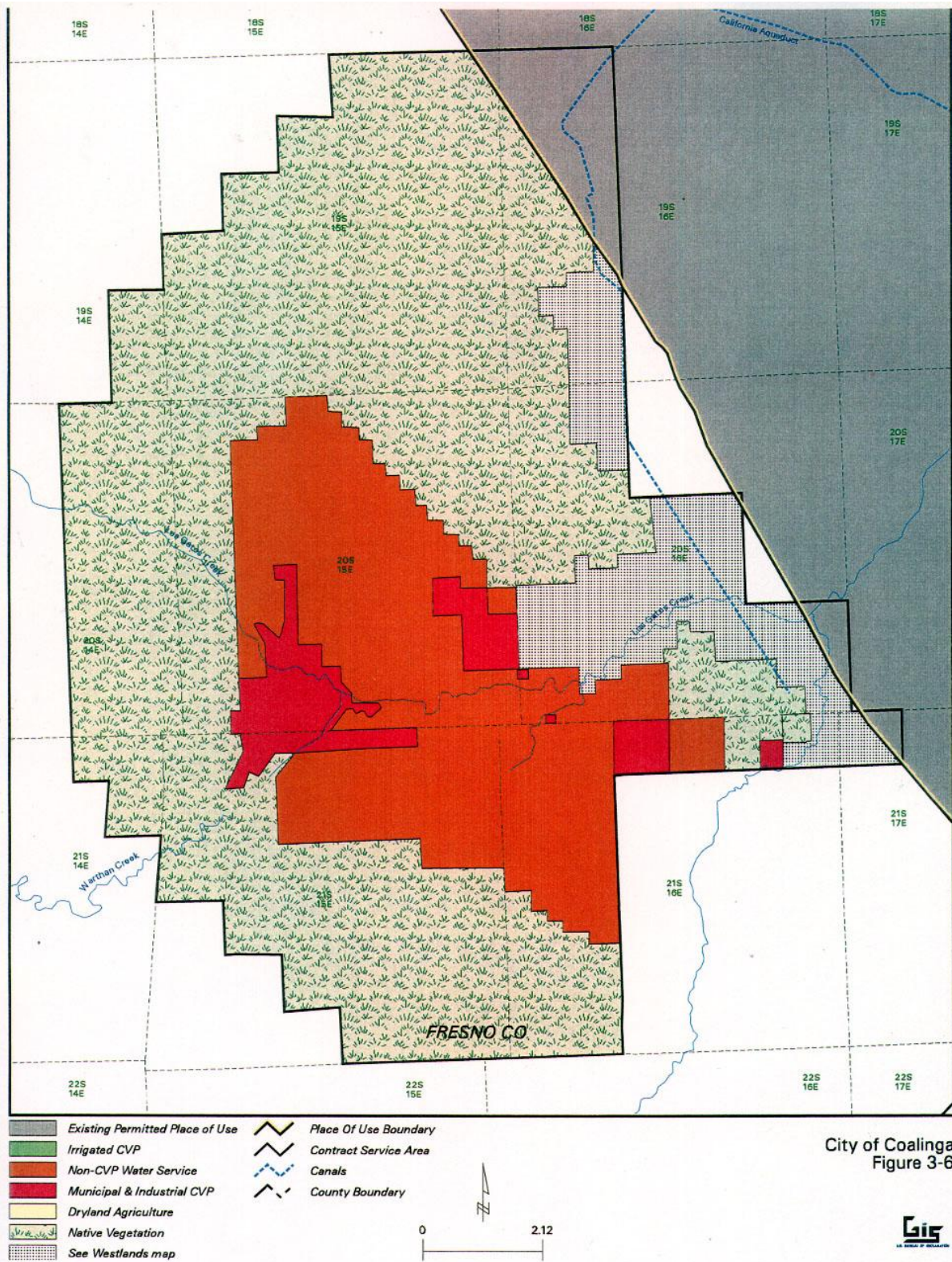
The City of Coalinga (Coalinga) entered into a long-term water service contract (No. 14-06-200-4173A) with Reclamation for CVP water delivery on October 28, 1968. Coalinga began delivery of the M&I water in October 1970.

3.4.5.1 General Description and Location

Coalinga is located near the southern boundary of the San Joaquin Valley. The town was developed and thrived for many years on groundwater and non-CVP water that was delivered from Armona. The Coalinga service area covers 106,618 acres. Of this total, about 99,167 acres are located outside the authorized POU. These lands are shown in Figure 3-6.

3.4.5.2 Land Use and Land Use Policies

The Coalinga service area is located within incorporated lands of the City of Coalinga, as well as within the unincorporated lands of Fresno County. The General Plans for the City and County designate these lands for primarily agricultural rangeland and M&I uses. The General



Plans also allow public facilities, mineral resources, open space, and parks and recreation uses within the CVP contract service area.

Of the 92,007 acres located outside the authorized POU, 4,674 acres are encroachment lands and 87,333 acres are expansion lands. 4,674 acres are in an M&I use, and 63,932 acres are undeveloped and support native vegetation. About 23,401 acres are in irrigated agriculture that use non-CVP water sources from Pleasant Valley Water District. About 7,160 acres are in both the City of Coalinga and Westlands Water District service areas. The land uses of the 7,160 acres are irrigated agriculture and undeveloped, supporting native vegetation. These overlapping lands are included in the discussion of Westlands Water District acreages presented in Section 3.4.25 of this EIR.

The irrigated and dryland agricultural operations, cattle feedlots, and ancillary industrial agricultural operations (e.g., processing and warehousing) occupy nearly 33,400 acres (31.3 percent) of the land in the Coalinga service area. Most of this land was developed and is being farmed with non-CVP water except for small areas along the eastern boundary of the service area. The CVP-serviced irrigated agricultural land receives water through contracts with Westlands Water District and is addressed in Section 3.4.25 of the EIR.

Rangeland activities include grazing and idle farmlands; those lands are identified as native vegetation in this EIR. In some locations, these areas are intermixed with oil and gas activities.

Three aggregate mining companies operate in the Coalinga service area. The operators extract rock, sand, and gravel through surface mining. Oil industry land use activities include exploration, development, production, and abandonment of wells and facilities. There are approximately 2,700 active oil wells in the Coalinga service area.

3.4.5.3 Geology and Soils

Coalinga is located in the southern San Joaquin Valley. The San Joaquin Valley is a structural trough bounded by the Coast Range on the west, which is composed primarily of ultramafic rock overlain by Cretaceous to Tertiary marine rock, Tertiary volcanics, and a mix of Tertiary to Quaternary age continental deposits (Lettis, 1982). The valley deposits consist of several thousand feet of Cenozoic sedimentary rocks and unconsolidated alluvium which reflect their geologic sources in the surrounding highlands, and their fluvial and alluvial depositional environments.

3.4.5.4 Water Resources and Water Use

Coalinga has a contract for the delivery of 10,000 acre-feet of CVP water for M&I use consistent with the CVP contract terms. Coalinga receives up to 7,000 acre-feet in restricted years. Coalinga has historically used up to 6,738 acre-feet of water per year.

From 15 to 20 percent of Coalinga's CVP water supply is used by the oil and gas industry for processing. The state prison receives 1,100 acre-feet per year. The Harris Feed Lot and Polvadero Golf Course use 1,050 acre-feet of untreated CVP water. The remaining water is used by the City for municipal service and domestic deliveries to area farms.

3.4.5.5 Groundwater Resources

Lands within the Coalinga service area outside the authorized POU have access to an unspecified amount of groundwater. However, because of current rates of groundwater overdraft in this area, this source is not expected to be available as a long-term supply. Groundwater resources in the area are brackish and therefore are not considered as an alternative water supply for M&I use.

3.4.5.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-15 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill riparian/fresh emergent wetland	0	0	0	15	903	918
Annual grassland/alkali scrub	0	0	0	4,659	86,430	91,089
TOTAL	0	0	0	4,674	87,333^b	92,007

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).
^bThis total does not include the 7,160 acres of habitat that overlap with Westlands Water District. The habitats of the 7,160 acres are included in Table 3-43.

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 32 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-16 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, the blunt-nosed leopard lizard, San Joaquin antelope squirrel, San Joaquin pocket mouse, burrowing owl, and San Joaquin woolly-threads have been observed on lands within the CVP contract service area outside the authorized POU.

Habitat	Species	Status
Alkali scrub Annual grassland	California jewelflower	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin woolly-threads	State: -- Federal: Endangered
Alkali scrub	Blunt-nosed leopard lizard	State: Endangered Federal: Endangered
Annual grassland Fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Alkali scrub	Fresno kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Species listed are in accordance with the state and federal Endangered Species Acts.		

A Habitat Conservation Plan (HCP), prepared in 1994 by Pleasant Valley Water District, covers 155,189 acres and encompasses the Coalinga contract service area. The HCP contains programs and policies to protect and enhance sensitive species in the area. When the new Coalinga Airport was designed, a habitat management area of 360 acres was dedicated for a San Joaquin kit fox management area. The airport lands previously were cultivated and used for agricultural production.

3.4.5.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, 10 sites have been recorded. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering numerous small prehistoric sites containing historic-era sites or features.

3.4.6 Colusa County Water District

Colusa County Water District (CCWD) entered into a long-term water service contract (No. 14-06-200-304-A) with Reclamation for CVP water delivery on May 21, 1963, and it was amended on June 18, 1964. CCWD also entered into a subcontract with the County of Colusa (No. 1-07-20-W0220) on December 9, 1980, amended on April 8, 1986, and on August 31, 1987.

CCWD's original water service contract expired on February 28, 1995. That contract was renewed for an interim period of 3 years effective March 1, 1995 (No. 14-06-200-304-A-IR1). The District's subcontract with the County of Colusa also was renewed for a 3-year interim period on December 12, 1994 (No. 1-07-20-W0220-IR1).

3.4.6.1 General Description and Location

CCWD is located in the central portion of the Sacramento Valley. The CCWD service area covers 45,954 acres. Of this total, about 2,147 acres are located outside the authorized POU. These lands are shown in Figure 3-7.

3.4.6.2 Land Use and Land Use Policies

The CCWD service area is located within the unincorporated lands of Colusa and Yolo counties. The Colusa County General Plan designates these lands for primarily agricultural and rural residential uses. The Yolo County General Plan designates these lands for primarily rangeland.

Of the 2,147 acres located outside the authorized POU, 1,499 acres are encroachment lands and 648 acres are expansion lands. 1,499 acres are in an irrigated agricultural land use, and the remaining 648 acres are undeveloped and support native vegetation. The irrigated land in the CCWD contract service area consists primarily of almonds, with the remainder used for growing wheat and other field crops.

3.4.6.3 Geology and Soils

The majority of CCWD's service area is ancient marine and alluvial deposits. Portions of CCWD extend into foothill areas of undifferentiated loams and adobes. The valley floor soils are primarily alluvial silt loams, clays, and sands. Sedimentary deposits on the valley floor form some of the prime agricultural soils. These sediments can have drainage problems, however, that limit the types of agricultural crops produced in this area (Sedway Cooke Associates, 1989).

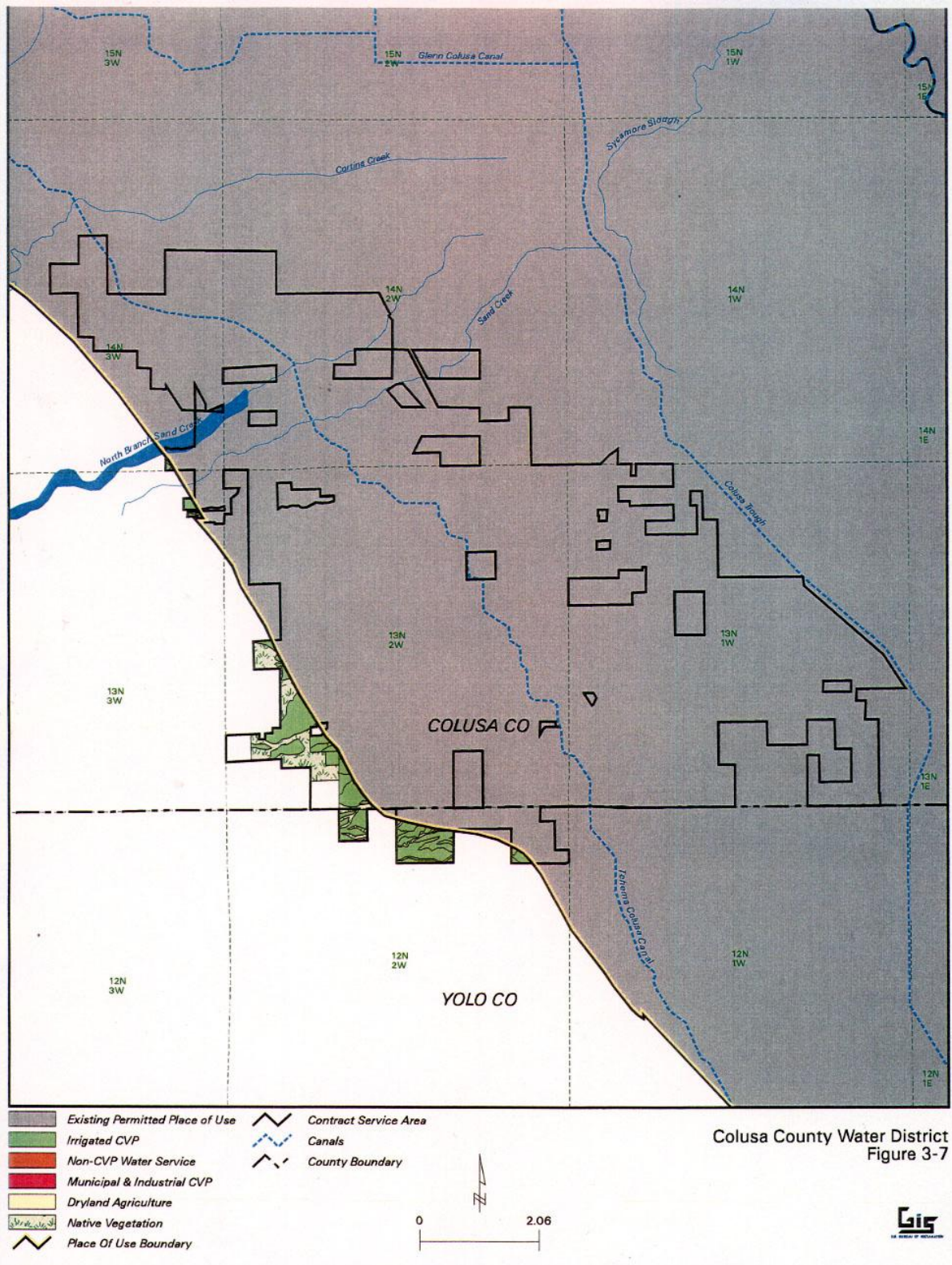
3.4.6.4 Water Resources and Water Use

CCWD has a contract for the delivery of 62,200 acre-feet of water. CVP water use is restricted to agricultural purposes consistent with the CVP contract terms. CCWD has historically used up to 61,582 acre-feet of water per year.

The lands that are identified in the encroachment and expansion areas historically have been cultivated (either as dryland agriculture or irrigated with a source other than CVP water) or are classified as Class 6, non-irrigable lands. CVP water is CCWD's only source of surface water supply.

3.4.6.5 Groundwater Resources

CCWD uses CVP water exclusively on lands outside the authorized POU and does not have alternative groundwater supplies capable of meeting the needs of uses in this area.



3.4.6.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by four vegetative community/habitat types. Table 3-17 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	13	0	0	67	80
Valley-foothill riparian/fresh emergent wetland	0	6	0	0	7	13
Mixed chaparral	0	31	0	0	3	34
Annual grassland/alkali scrub	0	1,449	0	0	571	2,020
TOTAL	0	1,499	0	0	648	2,147

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 10 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, three species (the peregrine falcon, valley elderberry longhorn beetle, and striped adobe lily), are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the POU.

3.4.6.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a moderate to high archaeological sensitivity with a moderate probability of encountering prehistoric habitation sites.

3.4.7 Contra Costa Water District

Contra Costa Water District (Contra Costa) entered into a water service and repayment contract (No. I75r-3401) with Reclamation for CVP water delivery on September 18, 1951 for delivery on March 1, 1953. The most recent amended contract was signed May 26, 1994, and expires December 31, 2010.

3.4.7.1 General Description and Location

Contra Costa is located east of the San Francisco Bay and south of the Sacramento River. The Contra Costa service area covers 115,220 acres. Of this total, about 1,031 acres are located outside the authorized POU. These lands are shown in Figure 3-8.

3.4.7.2 Land Use and Land Use Policies

The Contra Costa service area is located within the incorporated and unincorporated lands of Contra Costa County and a small portion of Alameda County. The Contra Costa County General Plan designates these lands for primarily urban, rural residential, commercial, industrial, open space, agricultural, watershed, and recreational uses. The Alameda County General Plan designates land outside the authorized POU for water management, resource management, and agricultural use. Land uses on lands outside the authorized POU in Alameda County include cattle grazing, rural residential uses, and agricultural uses (Contra Costa Water District et al., 1992).

The 1,031 acres located outside the authorized POU are expansion lands, classified as native vegetation. Some land is wetlands and is under water. Most of the area outside the authorized POU is protected from further development under terms associated with mitigation identified for the Los Vaqueros Project (Contra Costa Water District et al., 1992).

3.4.7.3 Geology and Soils

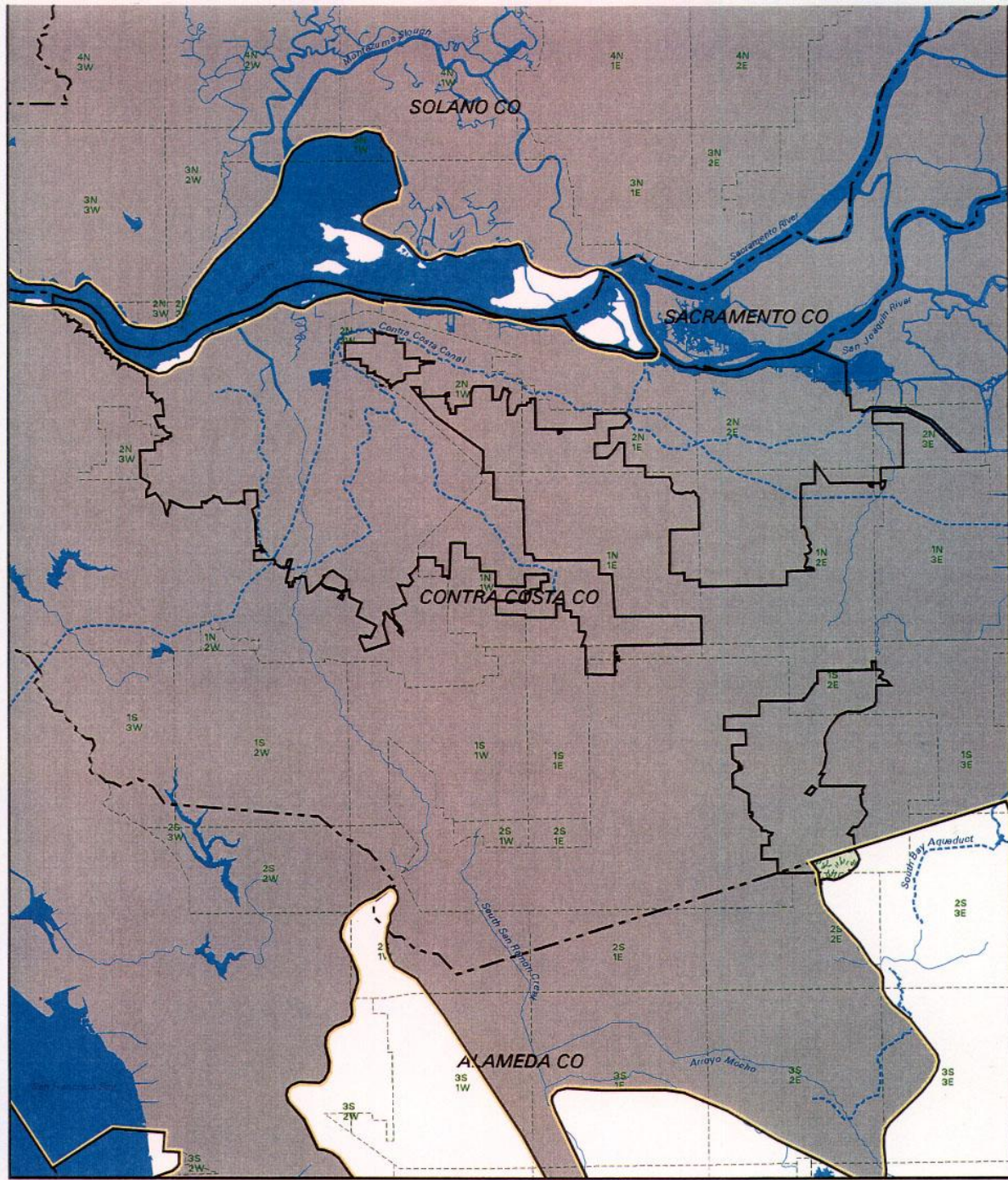
Contra Costa lands outside the authorized POU primarily consist of mountainous uplands composed of weathered sandstone and shale. A minor portion of the lands outside the authorized POU consists of alluvial deposits composed of floodplains and delta soils.

3.4.7.4 Water Resources and Water Use

Contra Costa has a contract for the delivery of 195,000 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. No CVP water is delivered to lands outside the authorized POU.

3.4.7.5 Groundwater Resources

The lands outside the authorized POU are located in the Kellogg Creek watershed. Kellogg Creek is a source of groundwater recharge in the watershed. Wells in the vicinity of the creek are used for primarily domestic purposes. Nearly all irrigation uses are supplied by imported surface water (Contra Costa Water District et al., 1992).



Contra Costa Water District
Figure 3-8



3.4.7.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-18 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table 3-18 Native Vegetation Types on Lands Outside the POU ^a						
Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	0	0	0	0	678	678
Saline emergent wetland	0	0	0	0	347	347
Valley-foothill riparian/fresh emergent wetland	0	0	0	0	6	6
TOTAL	0	0	0	0	1,031	1,031

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these communities and habitat types. Table D-2 lists the 21 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-19 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Table 3-19 Threatened and Endangered Species within Contra Costa Water District		
Habitat	Species	Status
Valley-foothill riparian/fresh emergent wetland	California red-legged frog	State: Species of Special Concern Federal: Threatened
Fresh emergent wetland Saline emergent wetland	California black rail	State: Threatened Federal: Species of Concern
Fresh emergent wetland Saline emergent wetland	California clapper rail	State: Endangered Federal: Endangered
Valley-foothill riparian/fresh emergent wetland Annual grassland	Peregrine falcon	State: Endangered Federal: Endangered
Saline emergent wetland	Saltmarsh harvest mouse	State: Endangered Federal: Endangered
Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Annual grassland	Antioch Dunes evening	State: Endangered

Table 3-19 Threatened and Endangered Species within Contra Costa Water District		
Habitat	Species	Status
	primrose	Federal: Endangered
Species listed are in accordance with the state and federal Endangered Species Acts.		

Based on a review of the CNDDDB, the California tiger salamander has been observed on lands within the CVP contract service area outside the authorized POU.

3.4.7.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, three sites have been recorded on lands outside the authorized POU. These lands were determined to have a low archaeological sensitivity with a high probability of encountering prehistoric sites during M&I development.

3.4.8 Corning Water District

Corning Water District (CWD) entered into a long-term water service contract (No. 14-06-200-6575) with Reclamation for CVP water delivery on August 1, 1957, and it was amended on March 9, 1962, and August 4, 1971. That contract expired on February 28, 1995. The contract was renewed for an interim period of 3 years effective March 1, 1995 (No. 14-06-200-6575-IR1).

3.4.8.1 General Description and Location

CWD is located in the north-central portion of the Sacramento Valley. The CWD service area covers 13,049 acres. Of this total, about 2,034 acres are located outside the authorized POU. These lands are shown in Figure 3-9.

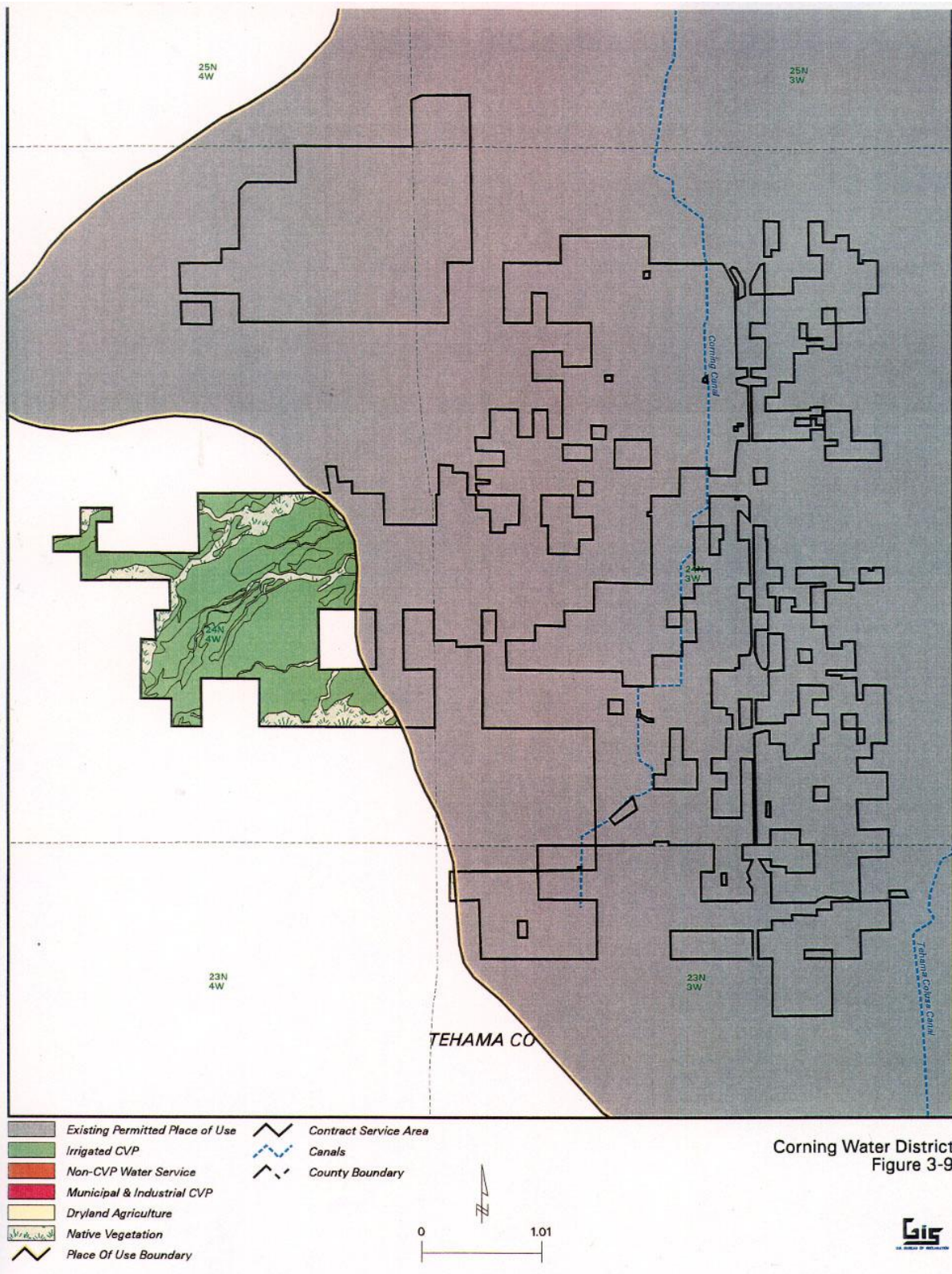
3.4.8.2 Land Use and Land Use Policies

The CWD service area is located within the incorporated lands of the City of Corning and within the unincorporated lands of Tehama County. The County and City General Plans designate these lands for primarily agricultural uses.

Portions of the land originally received CVP water in 1973, and other areas originally received CVP water in 1974. Other parcels received water in the late 1980s and early 1990s. All CVP water is used for irrigation purposes.

Of the 2,034 located outside the authorized POU, 1,647 acres are encroachment lands and 387 acres are expansion lands.

CWD records and recollection of local property owners indicate that the 2,034 acres identified in the encroachment and expansion areas have historically been dryland agriculture or are classified as Class 6, non-irrigable lands. About 1,647 acres currently receive CVP water, and 387 acres are classified as native vegetation.



Corning Water District
Figure 3-9



The primary irrigated land in the CWD contract service area supports rice, almonds, prunes and olives, with the remainder used to grow irrigated pasture and other field crops.

3.4.8.3 Geology and Soils

The CWD area is primarily a mixture of ancient marine and alluvial deposits. CWD extends into foothill soils that include undifferentiated loams and clays. Along the valley floor soils are alluvial silt loams, clays, and sands. The sedimentary deposits help form some of the prime agricultural soils. Some of these sediments, however, can be poorly drained and pose limitations for agricultural crops.

3.4.8.4 Water Resources and Water Use

CWD has a contract for the delivery of 25,300 acre-feet of water. CVP water use is restricted to agricultural purposes consistent with the CVP contract terms. Prior to the introduction of CVP water supplies, the 1,647 acres of encroached agricultural lands did not receive water from other sources. CWD has historically used up to 27,355 acre-feet of water per year.

CVP water is delivered via the Corning Canal. CVP water is CWD's only source of surface water supply.

3.4.8.5 Groundwater Resources

CWD uses CVP water exclusively on lands outside the authorized POU and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.8.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-20 identifies this type and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	0	1,612	0	0	367	1,979
Valley-foothill riparian/fresh emergent wetland	0	35	0	0	20	55
TOTAL	0	1,647	0	0	387	2,034

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in this community and habitat type. Table D-2 lists the 12 special-status species, designated by federal and state resource agencies, that are

expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, two species (the Swainson's hawk and peregrine falcon) are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, the Swainson's hawk and burrowing owl have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.8.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering prehistoric sites.

3.4.9 Del Puerto Water District

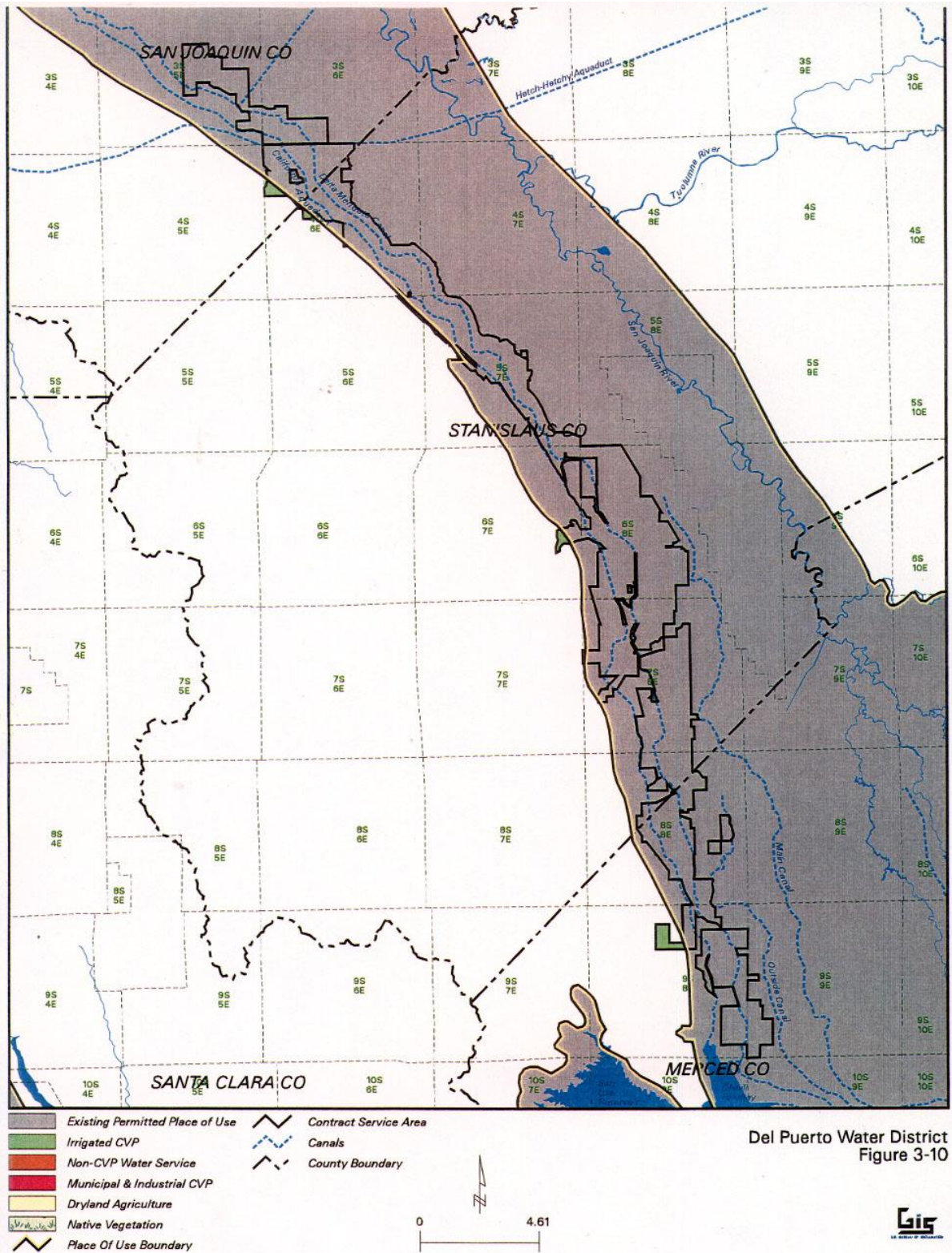
Del Puerto Water District (DPWD) entered into a long-term water service contract (No. 14-06-200-922) with Reclamation for CVP water delivery on June 10, 1953. On February 13, 1995, DPWD was assigned the water service contracts of the Hospital Water District (No. 14-04-200-923-IR1), Kern Cañon Water District (No. 14-06-200-924-IR1), Salado Water District (No. 14-06-200-925-IR1), Davis Water District (No. 14-06-200-1458-IR1), Sunflower Water District (No. 14-06-200-1804-IR1), Foothill Water District (No. 14-06-200-4323), Romero Water District (No. 14-06-200-7758), Orestimba Water District (No. 14-06-200-8091), Mustang Water District (No. 14-06-200-8103), and Quinto Water District (No. 14-06-200-8899). DPWD had two interim renewal contracts, No. 14-06-200-922-IR2 (entered into on February 27, 1995, for a 2-year period) and No. 14-06-200-4323-IR1 (entered into on February 29, 1996, for a 1-year period). DPWD now has one interim renewal contract (No. 14-06-200-922-IR3), which was entered into on February 27, 1997, for a 1-year period.

3.4.9.1 General Description and Location

DPWD is located in the northwestern portion of the San Joaquin Valley. The DPWD service area covers 34,479 acres. Of this total, about 1,000 acres are located outside the authorized POU. These lands are shown in Figure 3-10.

3.4.9.2 Land Use and Land Use Policies

The DPWD service area is located within the unincorporated lands of San Joaquin, Stanislaus, and Merced counties. The San Joaquin General Plan designates these lands for primarily general agricultural and public land uses. The Stanislaus County General Plan designates them for general agricultural, urban, rural residential, and commercial uses. The Merced County General Plan designates these lands primarily for general agricultural uses.



Del Puerto Water District
Figure 3-10



Of the 1,000 acres of land located outside the authorized POU, 808 acres are encroachment lands and 192 acres are expansion lands. DPWD records indicate that 261 acres have been cultivated and irrigated since 1956, 547 acres have been cultivated and irrigated since 1966, and the remaining 192 acres have been cultivated and irrigated during several years since 1974. Prior to these dates, all of these lands were cultivated in dryland agriculture. About 808 of the 1,000 acres are currently in irrigated agricultural land use and receive CVP water. The northernmost 192 acres in DPWD receive irrigation from non-CVP sources. The primary irrigated land in DPWD is cultivated in fruits, nuts, and vegetables, with the remainder used to grow cereals, forage, and other field crops.

3.4.9.3 Geology and Soils

DPWD is located in the northern San Joaquin Valley, southwest of Modesto. The San Joaquin Valley is a structural trough bounded by the Coast Range on the west. The valley deposits consist of several thousand feet of Cenozoic sedimentary rocks and unconsolidated alluvium that reflect their geologic sources in the surrounding highlands and their fluvial and alluvial depositional environments.

Eocene marine rocks exposed in the Coast Range are the primary source of elevated selenium concentrations in soil, sediment, and groundwater in the San Joaquin Valley. Particulates and dissolved ions are transported to the valley floor by weathering and erosion of the mineral-rich source rocks. Soils in parts of the San Joaquin Valley with selenium concentrations above the median concentration for United States soils of 0.3 mg/kg (Shacklette et al., 1974) are adjacent to the Coast Range where marine rocks are exposed (Gilliom et al., 1989). Soils in DPWD are generally located on upland terrace landforms and contain selenium concentrations between 0.13 and 0.36 mg/kg (Tidball et al., 1986).

3.4.9.4 Water Resources and Water Use

DPWD has a contract for up to 140,210 acre-feet of water for irrigation and M&I purposes. Prior to the introduction of CVP water supplies, all agricultural lands were dryland agriculture. Including water used under contracts assigned to it, DPWD has historically used up to 140,210 acre-feet of water per year.

3.4.9.5 Groundwater Resources

DPWD lands outside the authorized POU have access to an unspecified amount of groundwater resources from private wells. Intense pumping, causing groundwater overdrafts to occur in areas of the San Joaquin Valley, may potentially affect DPWD.

Groundwater in DPWD exhibits moderately high selenium concentrations. Elevated selenium concentrations are found in soils throughout DPWD (Tidball et al., 1986). The most soluble forms of selenium can be leached by precipitation and irrigation into the groundwater, and further concentrated by evapotranspiration. Subsurface drainage has been installed in many agricultural areas to flush selenium and other trace elements below the root zone. The use of local groundwater resources containing elevated selenium concentrations may pose a potentially significant threat to wildlife and other biological resources.

3.4.9.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-21 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill riparian/fresh emergent wetland	0	1	0	0	0	1
Annual grassland	0	807	0	0	192	999
TOTAL	0	808	0	0	192	1,000

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in these community and habitat types. Table D-2 lists the 23 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-22 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Habitat	Species	Status
Annual grassland Fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Valley-foothill riparian/fresh emergent wetland	Peregrine falcon	State: Endangered Federal: Endangered
Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Valley-foothill riparian/fresh emergent wetland	Valley elderberry longhorn beetle	State: -- Federal: Threatened
Annual grassland	Swainson's hawk	State: Threatened Federal: --
Annual grassland	San Joaquin antelope squirrel	State: Threatened Federal: Species of Concern

Species listed are in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, the San Joaquin kit fox and the Great Valley cottonwood riparian forest have been observed on lands within the DPWD contract service area outside the authorized POU.

3.4.9.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a low archaeological sensitivity with a low probability of encountering prehistoric sites.

3.4.10 East Bay Municipal Utility District

East Bay Municipal Utility District (EBMUD) entered into a long-term water service contract (No. 14-06-200-5183A) with Reclamation on December 22, 1970. The contract provided for delivery of up to 150,000 acre-feet of CVP water each year from the Folsom South Canal. However, subsequent court decisions did not allow EBMUD to take water at the Folsom South Canal, and no alternative CVP water delivery system was ever established except as noted below in water year 1978.

3.4.10.1 General Description and Location

EBMUD is located east of San Francisco Bay. The EBMUD service area covers 259,324 acres. Of this total, about 1,494 acres are located outside the authorized POU. These lands are shown in Figure 3-11.

3.4.10.2 Land Use and Land Use Policies

The EBMUD service area is located within the incorporated and unincorporated lands of Alameda and Contra Costa counties. The two County General Plans designate these lands for a wide variety of uses, including single-family residential, parks and recreation, open space, and agricultural uses.

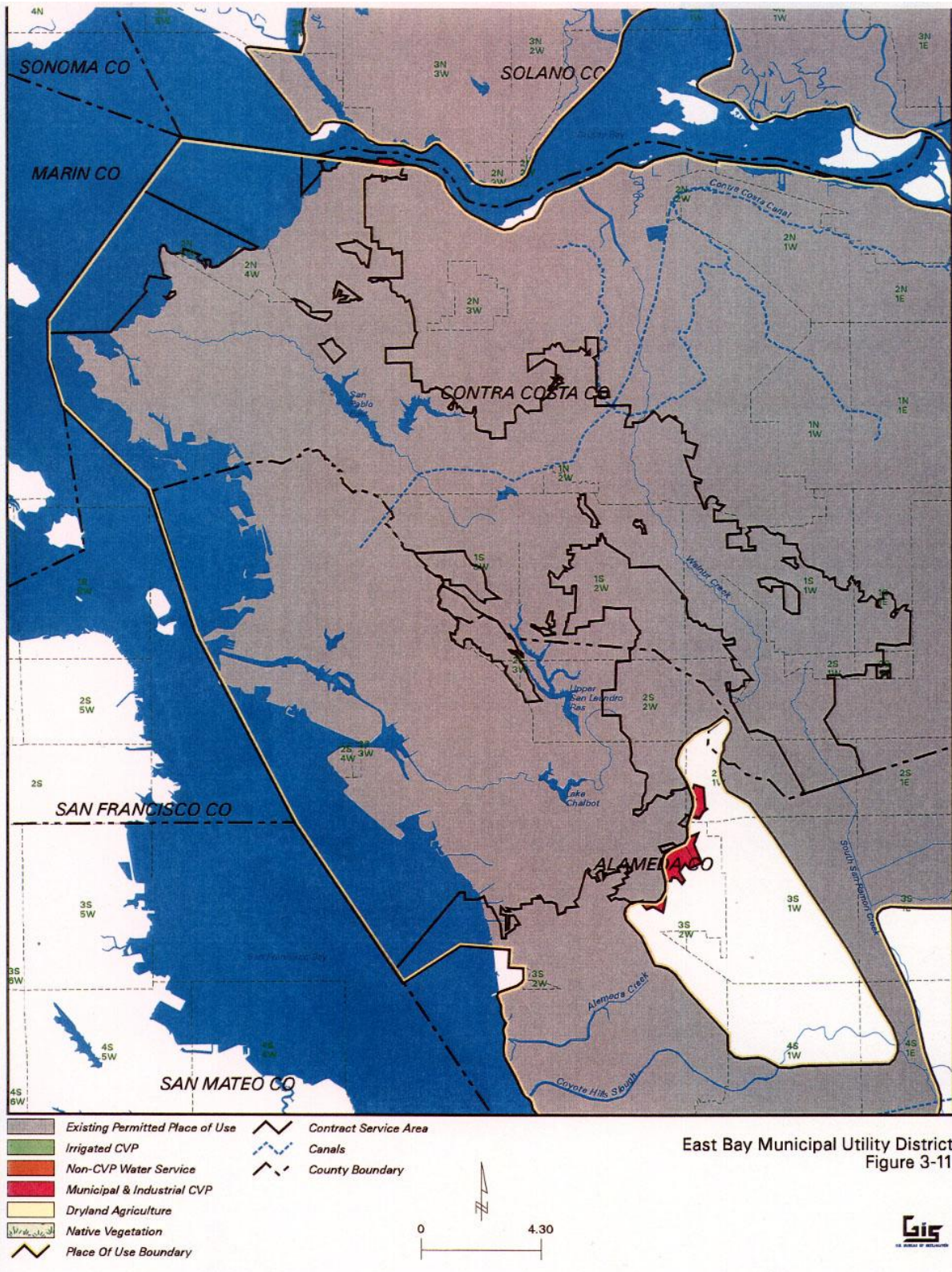
Of the 1,494 acres located outside the authorized POU, all lands are expansion lands, classified as M&I land use.

3.4.10.3 Geology and Soils

EBMUD lands outside the authorized POU are composed of mountainous uplands, consisting of weathered interbedded sedimentary rocks.

3.4.10.4 Water Resources and Water Use

CVP water was delivered to EBMUD only twice during one season in water year 1978. The water was released to the American River at Nimbus Dam and taken by EBMUD from the Sacramento-San Joaquin Delta. The CVP water was commingled with other water supplies and delivered to the entire service area.



CVP water use is restricted to M&I purposes consistent with the CVP contract terms. The 1,494 acres of M&I lands are supplied by non-CVP sources of water.

3.4.10.5 Groundwater Resources

Although groundwater resources are available in EBMUD, they are not abundant enough to satisfy water demand in the service area. If EBMUD were to rely on pumping of groundwater from local aquifers, saltwater intrusion from San Francisco Bay could result, and water quality may be substantially degraded. For lands located outside the authorized POU, local aquifers are not believed to provide sufficient supplies to meet existing and future M&I water demands.

3.4.10.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by five vegetative community/habitat types. Table 3-23 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	0	397	397
Valley-foothill riparian/fresh emergent wetland	0	0	0	0	36	36
Annual grassland	0	0	0	0	640	640
Mixed chaparral	0	0	0	0	260	260
Saline emergent wetland	0	0	0	0	161	161
TOTAL	0	0	0	0	1,494	1,494

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 26 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-24 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Habitat	Species	Status
Valley-foothill riparian/fresh emergent wetland	California red-legged frog	State: Species of Concern Federal: Threatened
Fresh emergent wetland Saline emergent wetland	California clapper rail	State: Endangered Federal: Endangered
Saline emergent wetland	Western snowy plover	State: Species of Special Concern Federal: Threatened
Saline emergent wetland	California least tern	State: Endangered Federal: Endangered
Fresh emergent wetland Saline emergent wetland	California black rail	State: Threatened Federal: Species of Concern
Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Valley-foothill hardwood-conifer Valley-foothill riparian/fresh emergent wetland Mixed chaparral	Alameda whipsnake	State: Threatened Federal: Proposed Endangered
Species listed are in accordance with state and federal Endangered Species Acts.		

Based on a review of the CNDDDB, the golden eagle, sharp-shinned hawk, and California red-legged frog have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.10.7 Cultural Resources

Lands within the boundaries of the EBMUD service area are expected to range from a low to high archaeological sensitivity, depending on a particular area's ability to support historic populations. Because the lands within the service area range from a low to high archaeological sensitivity, the lands would have a correspondingly low to high probability of encountering cultural resource sites.

A general cultural resources assessment was not performed for EBMUD for two reasons. First, past development of lands within the EBMUD service area was facilitated solely by non-CVP water sources; therefore, cultural resources that were present within the service area would have already been affected by non-CVP water sources. Secondly, if a water distribution system is established to deliver CVP water to the EBMUD service area in the future and CVP water delivery to EBMUD commences, the CVP water would not be delivered to currently undeveloped areas. Therefore, the potential to affect cultural resources, if any are present in the service area, is minimized. These two reasons, in combination, make it unnecessary to conduct an assessment to identify specific cultural resource sites throughout the EBMUD service area.

3.4.11 El Dorado Irrigation District

The County of El Dorado entered into a long-term water service contract (No. 14-06-200-7312) with Reclamation for CVP water delivery on July 25, 1958. El Dorado Hills County Water District entered into a long-term water service contract (No. 14-06-200-1357A) with Reclamation for CVP water

delivery on October 5, 1964. The contracts provided for water to be delivered from Folsom Lake to both districts. Both contracts were assigned to El Dorado Irrigation District (EID) in December 1973, and Reclamation approved the assignments in February 1974.

3.4.11.1 General Description and Location

EID is located east of the City of Sacramento and southeast of Folsom Lake. The EID service area covers 23,578 acres. The entire service area is located outside the authorized POU. These lands are shown in Figure 3-12.

3.4.11.2 Land Use and Land Use Policies

The EID service area is located within the incorporated and unincorporated lands of El Dorado and Sacramento counties. The El Dorado County General Plan designates these lands for primarily M&I, public facilities, parks and recreation, and open space uses. The Sacramento County General Plan designates these lands for general agricultural uses.

Of the 23,578 acres located outside the authorized POU, 18,945 acres are encroachment lands and 5,083 acres are expansion lands. 18,495 acres correspond to a M&I land use, and the remaining 5,083 acres are undeveloped and support native vegetation.

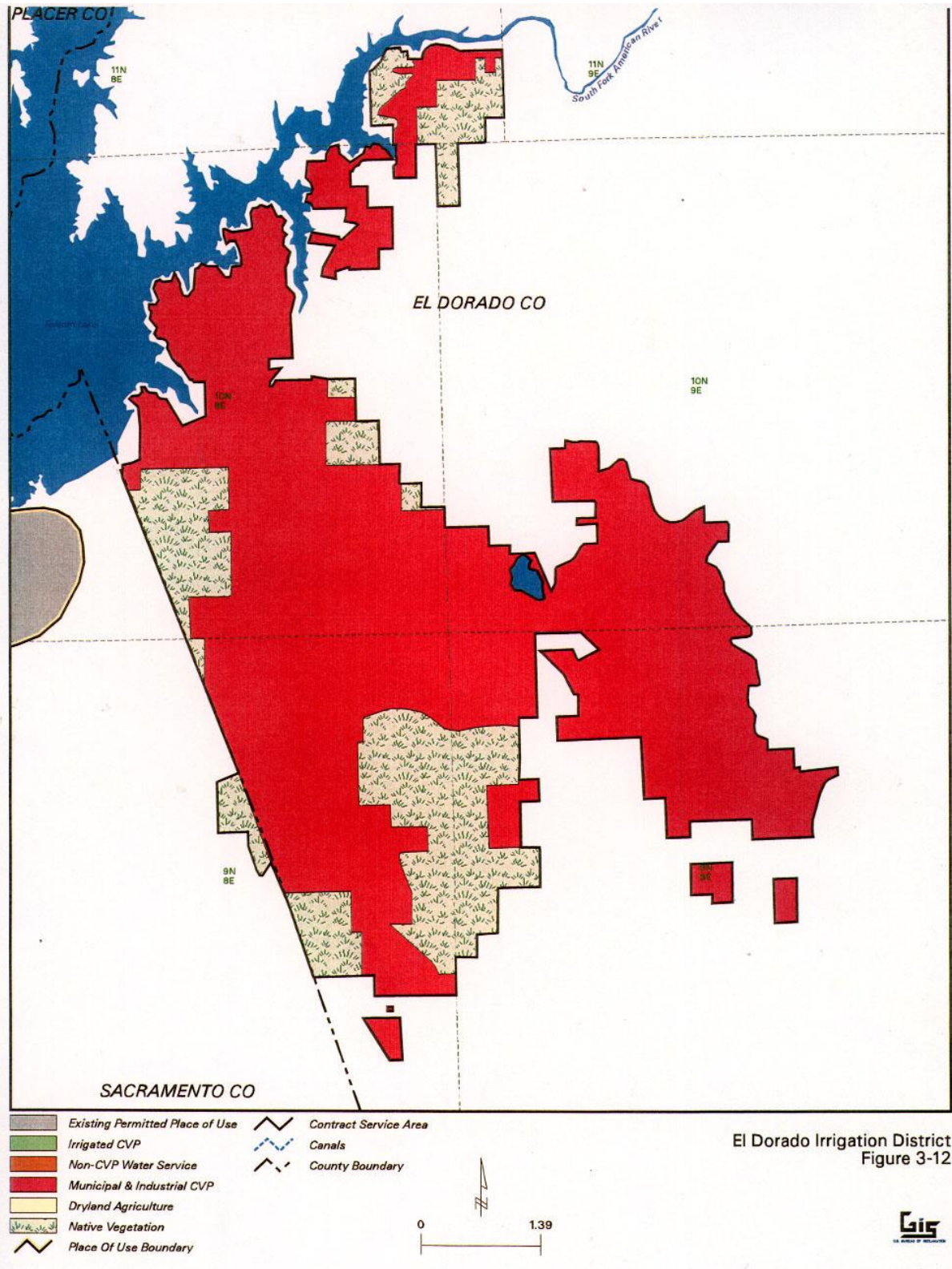
3.4.11.3 Geology and Soils

EID service area lands outside the authorized POU consist of mountainous uplands interspersed with alluvial valley bottoms. Soils in this area range from silty loams in the valley bottoms to extremely stony sandy loams on steeper slopes. Numerous outcrops of serpentine rock are located throughout this area on steeper hillsides.

On steeper slopes and hillsides in portions of the EID service area, gabbroic soils, formed from basalt, are mixed with serpentine rock. This geologic formation and associated soils provide a unique combination of conditions suitable for the establishment of several plant species that are limited in range and distribution. These species are discussed further in Section 3.4.11.6.

3.4.11.4 Water Resources and Water Use

The maximum quantity of water annually available under the two contracts is 7,550 acre-feet. The contracts are limited to M&I purposes. Prior to the introduction of CVP water supplies, the 18,495 acres of M&I lands were supplied by other sources of water (Sly Park). EID has historically used up to 5,000 acre-feet of water per year. Water deliveries in 1994 and 1995 totaled 3,965 and 4,316 acre-feet, respectively, from Folsom Lake.



El Dorado Irrigation District
Figure 3-12

Water furnished under the contracts is taken from Folsom Lake through a pumping plant located on the eastern side of the lake. The water serves Lake Hills Estates, which borders Folsom Lake at the lower end of the South Fork American River arm, and the residential development of El Dorado Hills.

3.4.11.5 Groundwater Resources

Although groundwater sources are available in the EID service area, they are not abundant enough to satisfy water demand of existing and future uses occurring in the district. The water appears to be of adequate quality for M&I uses.

3.4.11.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-25 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 30 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood	0	0	0	7,879	1,849	9,728
Annual grassland	0	0	0	10,616	3,234	13,850
TOTAL	0	0	0	18,495	5,083	23,578

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Of the species listed in Table D-2, the species in Table 3-26 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Table 3-26 Threatened and Endangered Species Within El Dorado Irrigation District		
Habitat	Species	Status
Open water	California red-legged frog	State: Species of Concern Federal: Threatened
Valley-foothill hardwood	Bald eagle	State: Endangered Federal: Threatened
Valley-foothill hardwood	Peregrine falcon	State: Endangered Federal: Endangered
Annual grassland	Swainson's hawk	State: Threatened Federal: --
Annual grassland	Layne's butterweed	State: Rare Federal: Threatened
Valley-foothill hardwood	Pine Hill ceanothus	State: Rare Federal: Endangered
Annual grassland	Pine Hill flannelbush	State: Rare Federal: Endangered
Annual grassland	El Dorado bedstraw	State: Rare Federal: Endangered
Annual grassland	Stebbin's morning glory	State: Endangered Federal: Endangered
Valley-foothill hardwood	Redhill's soaproot	State: -- Federal: Species of Concern
Valley-foothill hardwood	Bisbee Peak rush rose	State: -- Federal: Species of Concern
Valley-foothill hardwood	El Dorado County mule ears	State: -- Federal: Species of Concern
Species listed are in accordance with state and federal Endangered Species Acts.		

Based on a review of the CNDDDB, Pine Hill ceanothus, Layne's butterweed, tricolored blackbird, El Dorado bedstraw, bald eagle, Red Hill's soaproot, Stebbin's morning glory, and El Dorado County mule ears have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.11.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, 50 to 60 sites have been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites.

3.4.12 Glenn Valley Water District

Glenn Valley Water District (GVWD) entered into a long-term water service subcontract with the County of Colusa (1-07-20-W0219) on December 9, 1980. That subcontract expired on February 28, 1995, and was renewed for a 3-year interim period on December 12, 1994 (No. 1-07-20-W0219-IR1).

3.4.12.1 General Description and Location

GVWD is located in the southern portion of the Sacramento Valley. The GVWD service area covers 1,965 acres. Of this total, about 248 acres are located outside the authorized POU. These lands are shown in Figure 3-13.

3.4.12.2 Land Use and Land Use Policies

The GVWD service area is located within the unincorporated lands of Colusa County. The County General Plan designates these lands for primarily agricultural uses. All of the 248 acres located outside the authorized POU are expansion lands. Approximately 118 acres are in dryland agriculture, and the remaining 130 acres are dryland pasture supporting native vegetation. The 130 acres are classified as Class 6, non-irrigable lands.

The primary irrigated land in the GVWD service area consists of cotton and wheat, with the remainder used to grow tomatoes, melons, and other field crops.

3.4.12.3 Geology and Soils

The GVWD service area consists of primarily ancient marine and alluvial deposits. The service area does extend into foothill soils that include undifferentiated loams and adobes. Along the valley floor soils are alluvial silt loams, clays, and sands. The sedimentary deposits help form some of the prime agricultural land. Some of these sediments can be poorly drained and pose limitations for certain agricultural crops (Sedway Cooke Associates, 1989).

3.4.12.4 Water Resources and Water Use

GVWD has a contract for the delivery of 1,730 acre-feet of water. CVP water use is restricted to agricultural purposes consistent with the CVP contract terms. GVWD has historically used up to 1,261 acre-feet of water per year.

3.4.12.5 Groundwater Resources

GVWD uses CVP water on lands within of the authorized POU; CVP water is not delivered outside the authorized POU. GVWD does not have alternative groundwater supply sources that could meet the water demand of future uses on these lands.

3.4.12.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-27 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	0	0	0	0	244	244
Valley-foothill riparian/fresh emergent wetland	0	0	0	0	4	4
TOTAL	0	0	0	0	248	248

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in these habitat types. Table D-2 lists the 10 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, one species (the peregrine falcon) is designated as endangered in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.12.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, one site has been recorded on lands outside the authorized POU. These lands were determined to have a moderate archaeological sensitivity with a high probability of encountering prehistoric sites during agricultural development.

3.4.13 Kanawha Water District

Kanawha Water District (KWD) entered into a long-term water service contract (No. 14-06-200-466-A) on April 19, 1963, and it was amended on May 18, 1972, and April 15, 1977. That contract expired on February 28, 1995. The contract was renewed for an interim period of 3 years effective March 1, 1995 (No. 14-06-200-466-A-IR1).

3.4.13.1 General Description and Location

KWD is located in the west-central portion of the Sacramento Valley. The KWD service area covers 15,967 acres. Of this total, about 902 acres are located outside the authorized POU. These lands are shown in Figure 3-14.

3.4.13.2 Land Use and Land Use Policies

The KWD service area is located within the unincorporated lands of Glenn County. The County General Plan designates these lands for primarily agricultural uses. KWD records indicate that the lands identified in the encroachment and expansion areas have historically been dryland agriculture or are classified as Class 6, non-irrigable lands.

Of the 902 acres located outside the authorized POU, 689 acres are encroachment lands and 213 acres are expansion lands. 689 acres are in an irrigated agricultural land use, and the remaining 213 acres are undeveloped and support native vegetation. The primary irrigated land in KWD's service area consists of alfalfa and wheat, with the remainder used to grow pasture and other field crops.

3.4.13.3 Geology and Soils

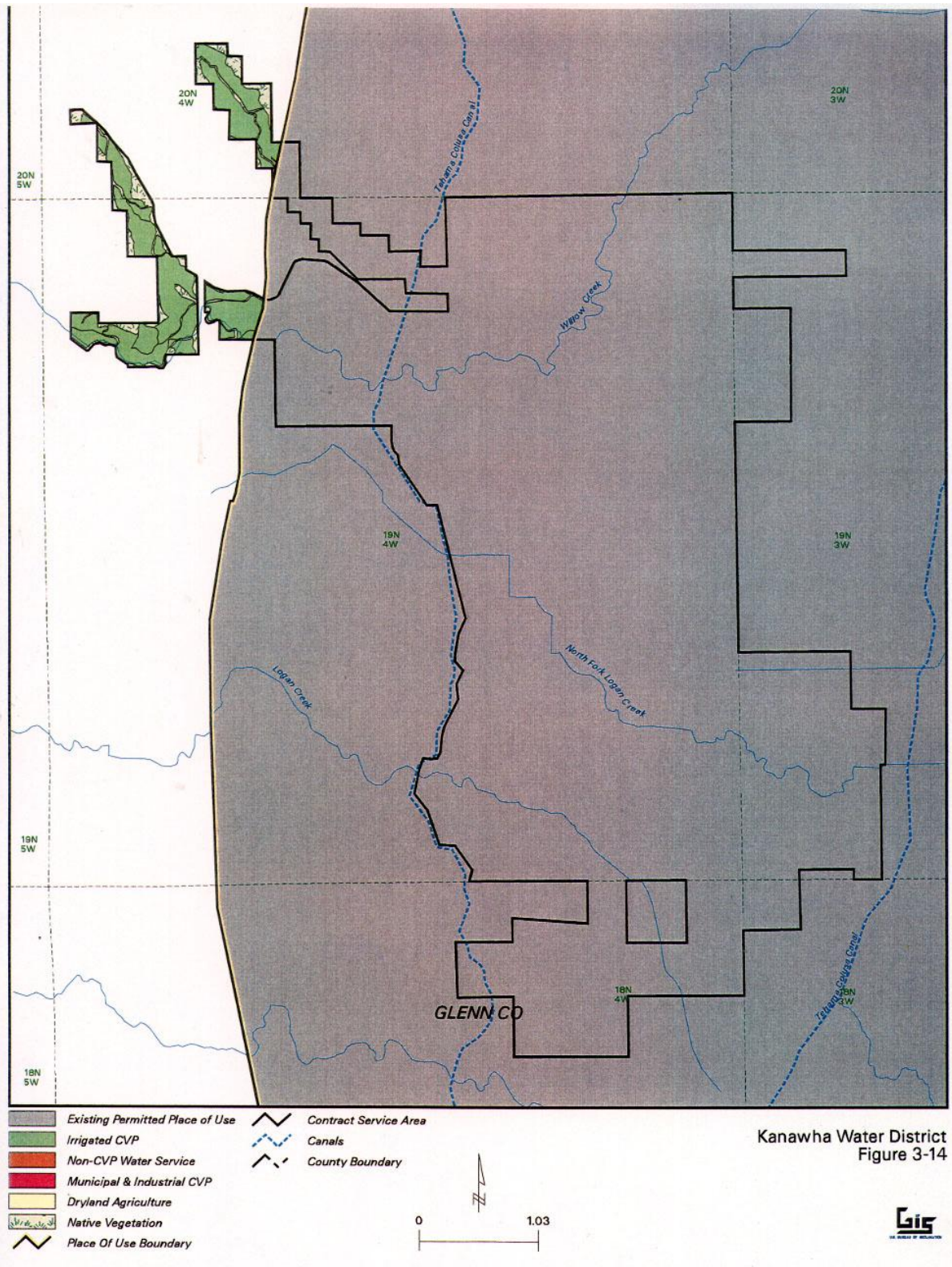
Soils in the vicinity of the KWD are well-drained, moderately permeable soils associated with low terraces and alluvial fans. Soils in this region are represented primarily by the following four soil associations: the Arbuckle-Kimball-Hillgate, the Hillgate-Arbuckle-Artois, the Tehama-Plaza, and the Myers-Hillgate. In addition, the southerly portion of KWD includes areas of relatively poorly drained, fine-textured basin soils of the Willows-Capay association. The Arbuckle series consists of nearly level to gently sloping, deep, well-drained soils that are gravelly and have a claypan. These soils are used for range, dryland farming, irrigated shallow-rooted crops, and forage crops.

The Tehama series consists of nearly level, well-drained soils. The Plaza series consists of nearly level and somewhat poorly-drained soils. These two soils are used for irrigated row, field, pasture, and tree crops. The Myers series are nearly level, deep, well-drained soils. These soils are primarily cultivated in dryland agriculture or irrigated cropland. The Willows-Capay series consists nearly level, poorly-drained soils. Willow soils are used primarily for rice, and Capay soils are used for a wide variety of crops (USDA, 1968).

3.4.13.4 Water Resources and Water Use

KWD has a contract for the delivery of 45,000 acre-feet of water. CVP water is used for agricultural purposes, although the water service contract allows M&I service. Prior to the introduction of CVP water supplies, the 689 acres of irrigated encroached agricultural lands did not receive water from other sources. KWD has historically used up to 41,699 acre-feet of water per year. CVP water is KWD's only source of surface water supply.

SECTION 3 ENVIRONMENTAL SETTING



3.4.13.5 Groundwater Resources

KWD uses CVP water exclusively on lands outside the authorized POU and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.13.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-28 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	665	0	0	0	207	872
Valley-foothill riparian/fresh emergent wetland	24	0	0	0	6	30
TOTAL	689	0	0	0	213	902

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 14 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, one species (the peregrine falcon) is designated as endangered in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.13.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering prehistoric sites.

3.4.14 Mountain Gate Community Services District

Mountain Gate Community Services District (MGCS D) entered into a long-term water service contract (No. 14-06-200-6998) with Reclamation for CVP water delivery on March 12, 1958. MGCS D began delivery of the M&I water on August 1, 1963. MGCS D also receives up to 500 acre-feet of CVP water through a subcontract with Shasta County Water Agency (No. PW-4, entered into on February 9, 1982).

3.4.14.1 General Description and Location

MGCS D is located in the northern Sacramento Valley, south of Shasta Lake. The MGCS D service area covers 4,012 acres. Of this total, about 3,992 acres are located outside the authorized POU. These lands are shown in Figure 3-15.

3.4.14.2 Land Use and Land Use Policies

The MGCS D service area is located within the incorporated and unincorporated lands of Shasta County. The County General Plan designates these lands for primarily M&I and mineral resource uses.

Users in the contract service area include Calaveras Cement Company, which uses approximately 201 acre-feet of M&I water annually, and Fondale Rock Company, which uses 17 acre-feet annually. MGCS D is comprised primarily of rural residences, ranging in size from 2½ acres to 40 acres.

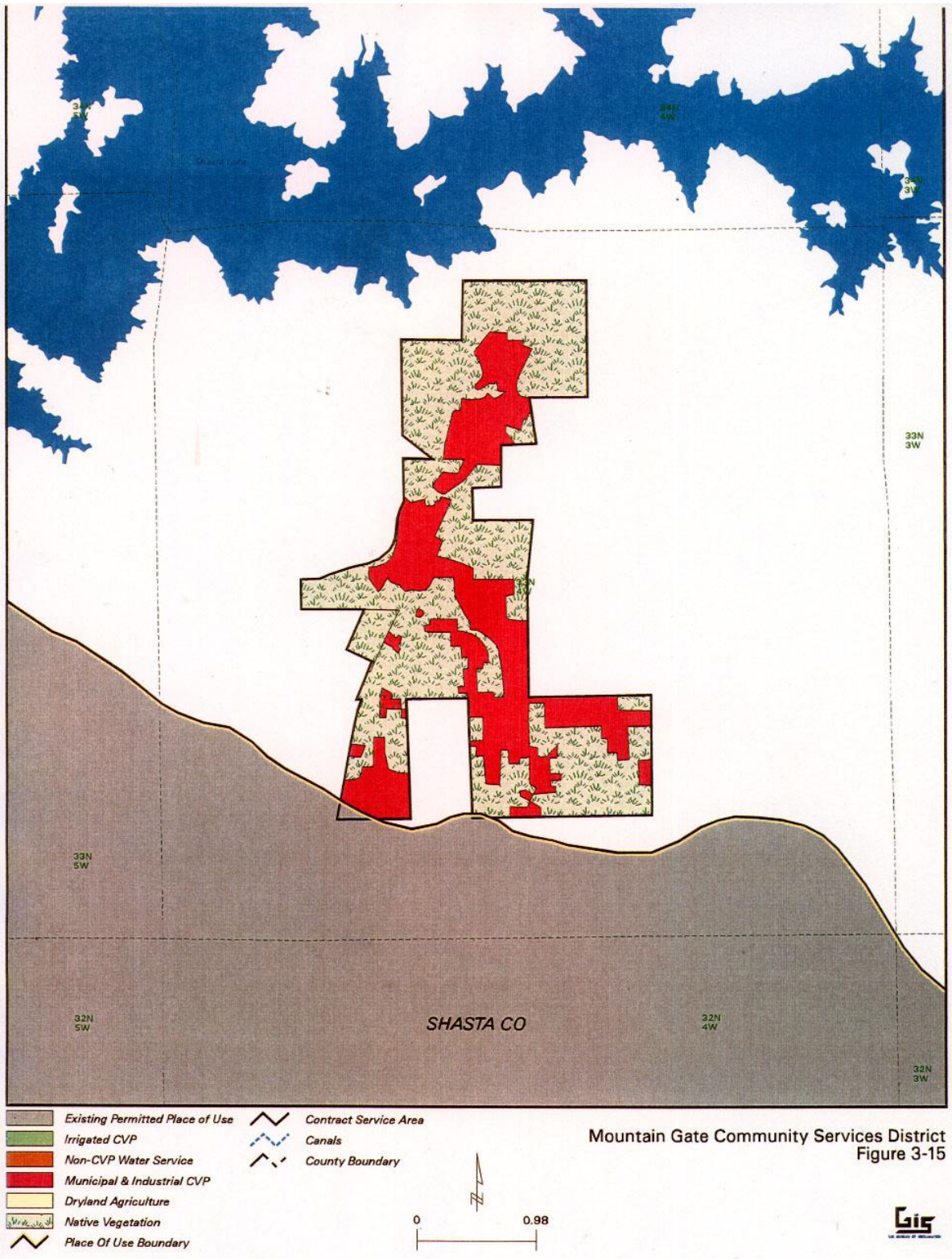
Of the 3,992 acres located outside the authorized POU, 1,406 acres are encroachment lands and 2,586 acres are expansion lands. 1,406 acres correspond to a M&I land use, and the remaining 2,586 acres are undeveloped and support native vegetation. Approximately 20 percent (798 acres) outside the authorized POU are not expected to be developed because of steep topography. There are no plans for major development in the future.

3.4.14.3 Geology and Soils

The MGCS D service area is located on primarily foothill geologic formations and soils that are interspersed with alluvial and valley deposits. The foothill deposits consist of well-drained gravelly loams, and the valley deposits consist of moderately well-drained cobbly clay loams.

3.4.14.4 Water Resources and Water Use

MGCS D has a contract with Reclamation for the delivery of 350 acre-feet of water and receives up to 500 acre-feet through a subcontract with Shasta County Water Agency. CVP water use is restricted to M&I purposes consistent with the CVP contract terms.



Mountain Gate Community Services District
Figure 3-15

The lands that are identified in the encroachment and expansion areas have historically been supplied by a water source other than CVP. Many wells served the community prior to receiving CVP water. Stillwater Creek was another surface water source, but it is no longer available. Expansion of the community occurred, in part, because of a reliable CVP water supply. The volume of CVP water delivered to MGCSD outside the authorized POU is approximately 588 acre-feet.

CVP water is delivered to MGCSD from Shasta Lake for use within the MGCSD service area. CVP water and groundwater are MGCSD's only sources of surface water supply.

3.4.14.5 Groundwater Resources

These lands outside the authorized POU have access to a limited supply of water from district-owned groundwater wells as an alternative to receiving CVP water. The quantity of available groundwater would be inadequate to meet the water demands of the district. There is no indication that groundwater use in this region would be hindered by water quality issues.

3.4.14.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by four vegetative community/habitat types. Table 3-29 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	254	924	1,178
Valley-foothill riparian/fresh emergent wetland	0	0	0	23	36	59
Annual grassland	0	0	0	839	794	1,633
Mixed chaparral	0	0	0	290	832	1,122
TOTAL	0	0	0	1,406	2,586	3,992

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 16 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, three species (the California red-legged frog, Shasta salamander, and bald eagle) are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, the Shasta salamander, Shasta sideband snail, and silky cryptantha have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.14.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites in the area during agricultural development.

3.4.15 Orland-Artois Water District

Orland-Artois Water District (OAWD) entered into a long-term water service contract (No. 14-06-200-8382A) on February 26, 1976. That contract expired on February 28, 1995. The contract was renewed for an interim period of 3 years effective March 1, 1995 (No. 14-06-200-8382A-IR1).

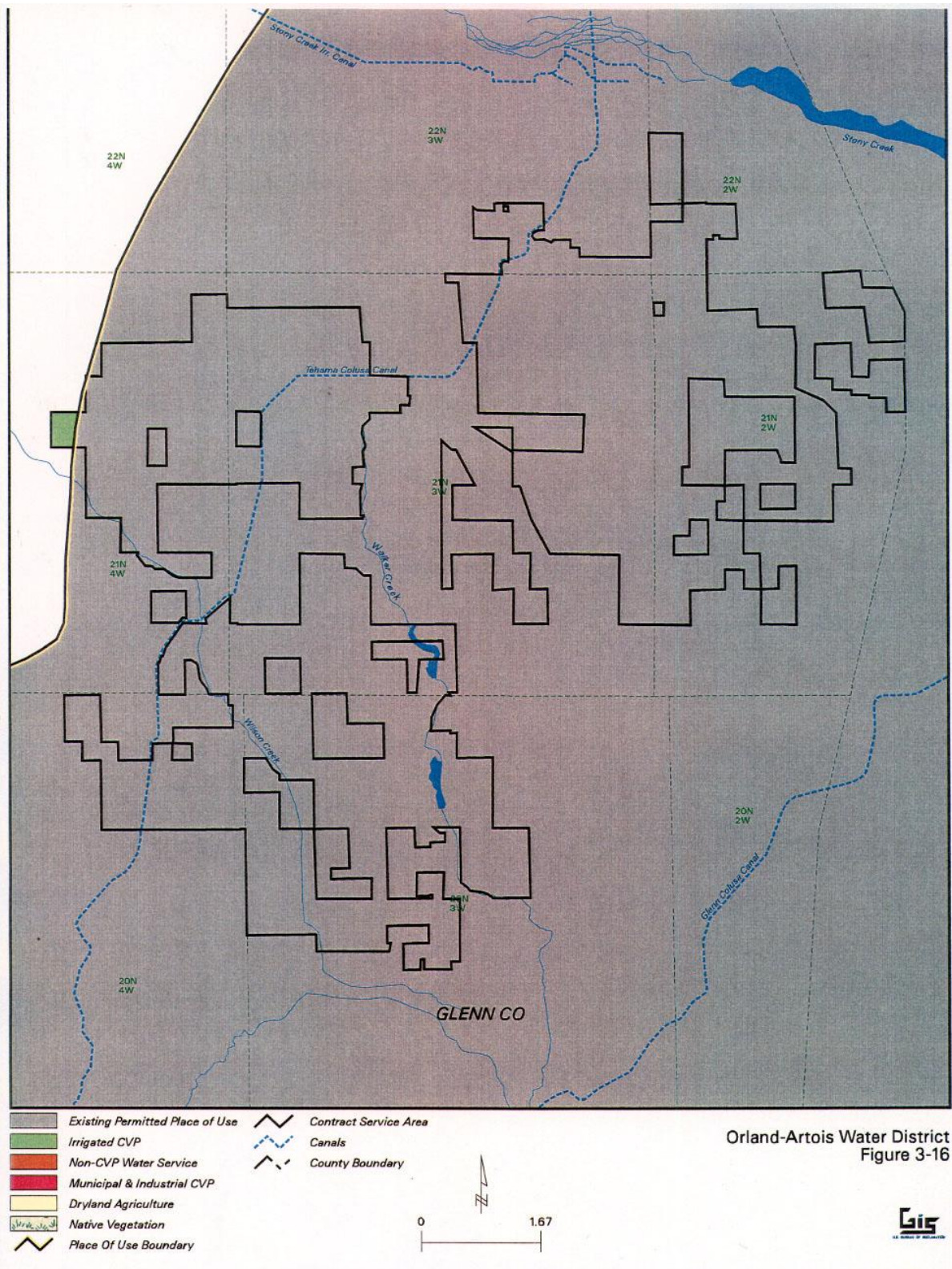
3.4.15.1 General Description and Location

OAWD is located in northern Sacramento Valley. The OAWD service area covers 31,292 acres. Of this total, about 111 acres are located outside the authorized POU. These lands are shown in Figure 3-16.

3.4.15.2 Land Use and Land Use Policies

The OAWD service area is located within the incorporated and unincorporated lands of Glenn County. The County General Plan designates these lands for primarily agricultural and rangeland uses.

OAWD records indicate that all 111 acres identified in the encroachment area that currently receive CVP water were previously irrigated with groundwater.



Orland-Artois Water District
Figure 3-16



3.4.15.3 Geology and Soils

Soils in the vicinity of OAWD are well-drained, moderately permeable soils associated with low terraces and alluvial fans. Soils in this region are represented primarily by the following four soil associations: the Arbuckle-Kimball-Hillgate, the Hillgate-Arbuckle-Artois, the Tehama-Plaza, and the Myers-Hillgate. In addition, the northerly portion of OAWD includes areas of well-drained to excessively drained soils of the Cortina-Orland association.

The Arbuckle series consists of nearly level to very gently sloping, deep, well-drained soils that are gravelly. These soils are used for many irrigated row crops, field crops, and orchard crops. The Kimball and Artois series consist of nearly level, well-drained soils that have a claypan. These soils are used for range, dryland agriculture, and irrigated shallow-rooted field and forage crops.

The Tehama series are nearly level, well-drained soils, primarily used for irrigated row, field, pasture, and tree crops. The Plaza series consists of nearly level, poorly-drained soils primarily used to grow rice and irrigated pasture. The Myers series are deep, nearly level soils that are well-drained. These soils are primarily cultivated in dryland agriculture or irrigated cropland. The Cortina and Orland series consists of well-drained to excessively drained soils. These two soils are primarily used to grow alfalfa, orchards, and irrigated row and field crops (USDA, 1968).

3.4.15.4 Water Resources and Water Use

OAWD has a contract for the delivery of 53,000 acre-feet of water. CVP water use is restricted to agricultural purposes consistent with the CVP contract terms. Prior to the introduction of CVP water supplies, all 111 acres of irrigated agricultural lands were supplied by groundwater. CVP water is OAWD's only source of surface water supply. Currently all 111 acres are irrigated by CVP water. In 1995, the volume of CVP water delivered outside the authorized POU was approximately 300 to 400 acre-feet.

The primary irrigated land in the OAWD contract service area consists of almonds, rice, and wheat, with the remainder used to grow pasture, alfalfa, and other field crops.

3.4.15.5 Groundwater Resources

OAWD lands outside the authorized POU have access to an unspecified amount of groundwater from private wells; however, the volume of available groundwater is limited. There is no indication that groundwater use would be hindered by water quality issues.

3.4.15.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by one vegetative community/habitat type. Table 3-30 identifies this type and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	0	111	0	0	0	111
TOTAL	0	111	0	0	0	111

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in this community and habitat type. Table D-2 lists the seven special-status species, designated by federal and state resource agencies, that are expected to have been present on encroached lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, one species (the Swainson's hawk) is designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.15.7 Cultural Resources

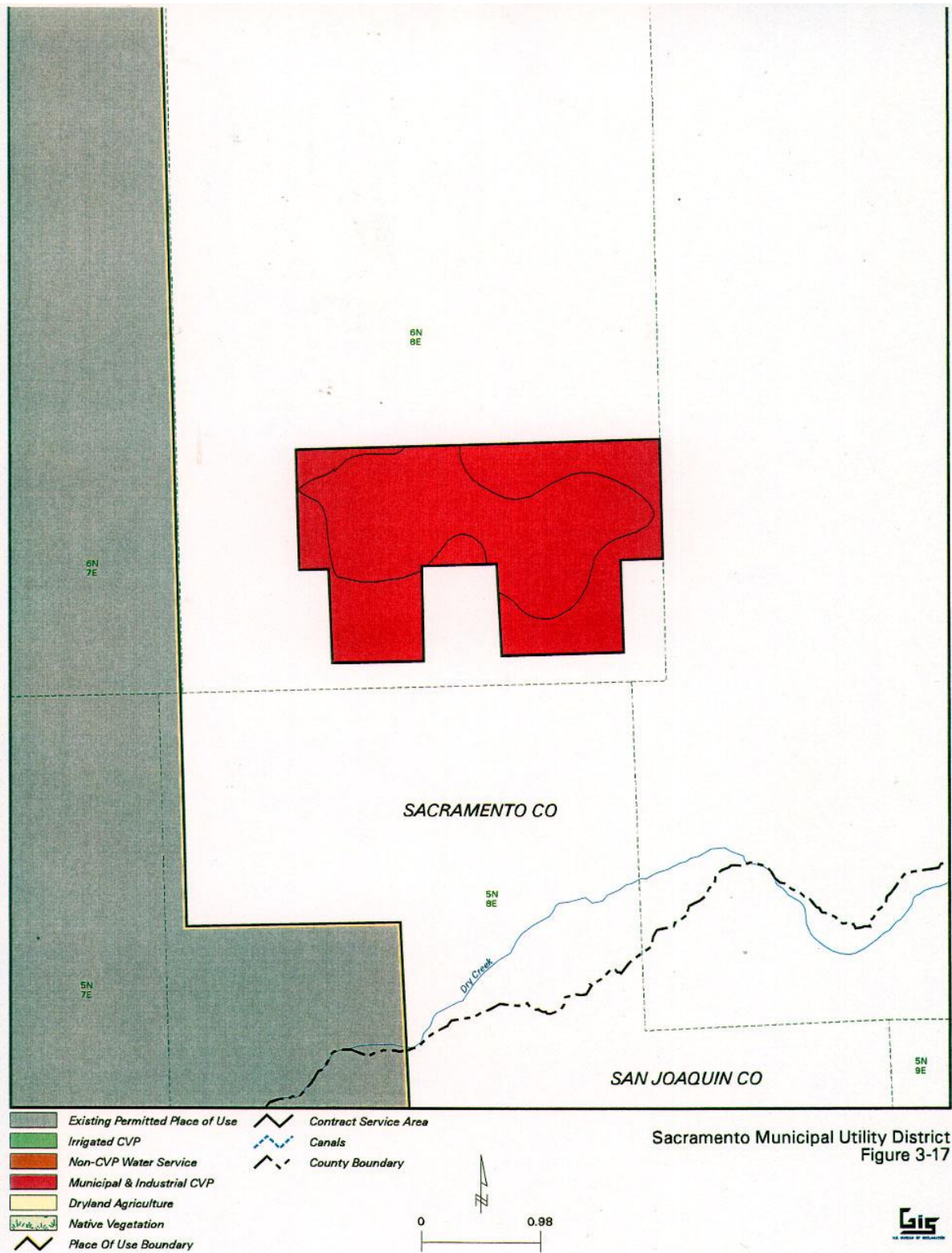
Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a low archaeological sensitivity with a low probability of encountering prehistoric sites during agricultural development.

3.4.16 Sacramento Municipal Utility District

Sacramento Municipal Utility District (SMUD) entered into a long-term water service contract (No. 14-06-200-5198A) with Reclamation for CVP water delivery on November 20, 1970.

3.4.16.1 General Description and Location

SMUD is located in the southeastern portion of Sacramento County. The SMUD service area covers 2,830 acres. The entire service area is located outside the authorized POU. These lands are shown in Figure 3-17.



3.4.16.2 Land Use and Land Use Policies

The SMUD service area is located within the unincorporated lands of Sacramento County. The County General Plan designates these lands for public facilities (primarily for the Rancho Seco nuclear power plant). All of the 2,830 acres located outside the authorized POU are encroachment lands that correspond to a M&I land use.

3.4.16.3 Geology and Soils

SMUD lands are located on high terrace deposits composed of well-drained soils overlying a cemented hardpan.

3.4.16.4 Water Resources and Water Use

Water provided pursuant to this contract is delivered from the Folsom South Canal to SMUD's Rancho Seco nuclear power plant located on 2,830 acres. SMUD has used its water supply for power production at the Rancho Seco nuclear power plant. Use of this water for this purpose is restricted to the immediate area of the power plant.

SMUD's contract is for the delivery of 60,000 acre-feet of CVP water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. SMUD has an agreement with the City of Sacramento for the use of up to 15,000 acre-feet of non-CVP water.

When the nuclear power plant was operational, some of the water was used in the cooling towers to condense the spent steam for recirculation. Standby cooling water was stored in a small lake that provided recreational opportunities for the public. Recreation facilities around the lake include picnic tables, boat ramps, a swimming beach, restrooms, and parking areas.

The plant was decommissioned in 1988 and now requires only small amounts of water to cool the nuclear fuel stored onsite. Water for the power plant and Rancho Seco Park is supplied by a pumping facility at Folsom South Canal. An onsite park well and pump supply water for two permanent residences and a snack bar. Water is also used to maintain the lake and recreation facilities and the landscaping around the power plant. In 1994, 1,611 acre-feet of CVP water was delivered to the service area. In 1995, 2,959 acre-feet of CVP water was delivered.

3.4.16.5 Groundwater Resources

SMUD lands outside the authorized POU have access to 352 acre-feet per year of groundwater from district-owned wells. There is no indication that groundwater use would be limited by water quality issues.

3.4.16.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-31 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual grassland	0	0	2,603	0	0	2,603
Fresh emergent wetland	0	0	58	0	0	58
Open water	0	0	169	0	0	169
TOTAL	0	0	2,830	0	0	2,830

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 22 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-32 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, northern hardpan vernal pool habitat has been observed on lands within the CVP contract service area outside the authorized POU.

3.4.16.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no specific sites have been recorded. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering small habitation locales/lithic scatters.

Table 3-32 Threatened and Endangered Species within Sacramento Municipal Utility District		
Habitat	Species	Status
Annual grassland Fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Fresh emergent wetland	Vernal pool fairy shrimp	State: -- Federal: Threatened
Annual grassland	Vernal pool tadpole shrimp	State: -- Federal: Endangered
Annual grassland	Swainson's hawk	State: Threatened Federal: --
Annual grassland	Sacramento orcutt grass	State: Endangered Federal: Proposed Endangered
Fresh emergent wetland	Bogg's Lake hedge-hyssop	State: Endangered Federal: --
Species listed are in accordance with state and federal Endangered Species Acts.		

3.4.17 San Benito County Water District

San Benito County Water District (SBCWD) entered into a long-term water service contract (No. 8-07-20-W0130) with Reclamation for CVP water delivery on February 28, 1992.

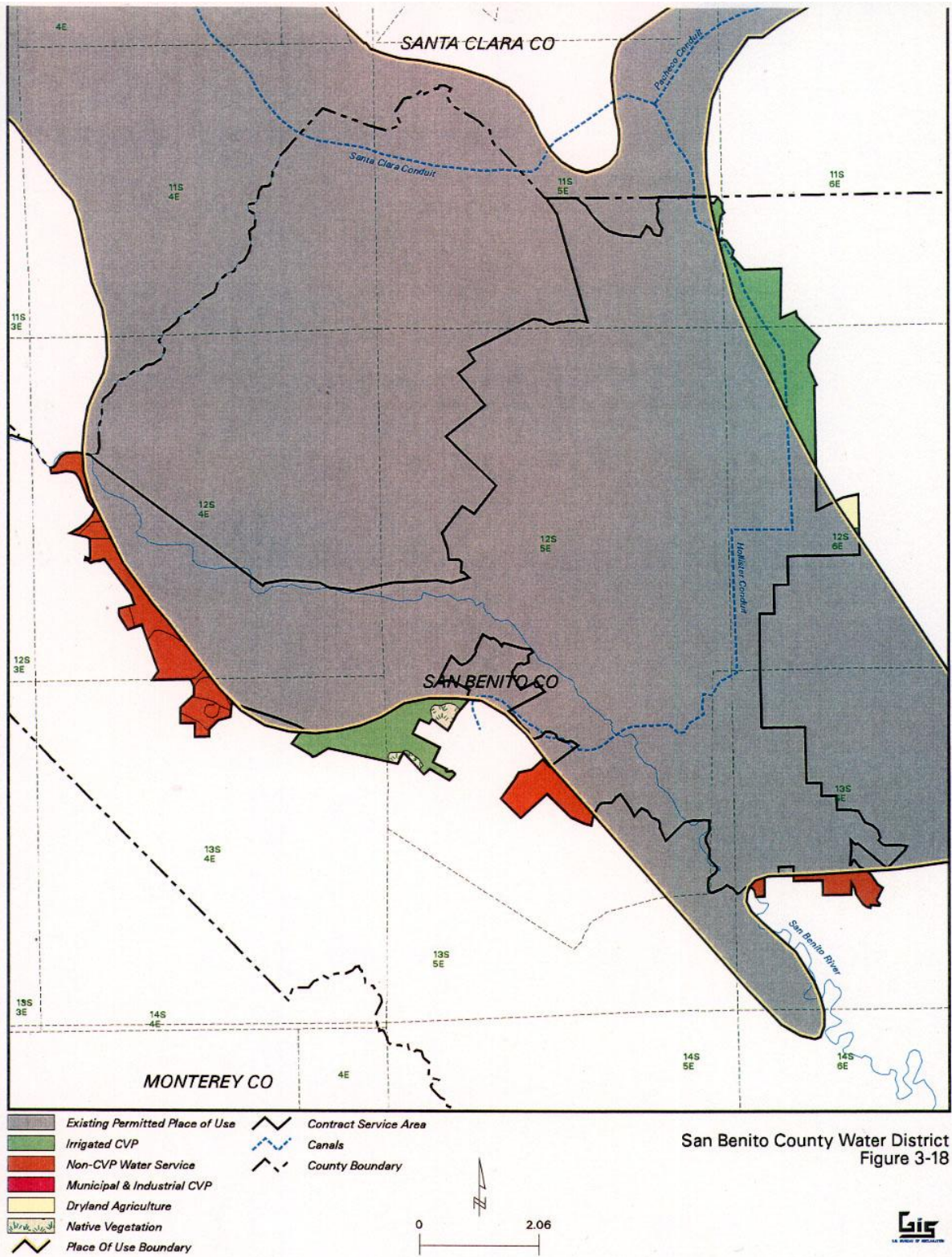
3.4.17.1 General Description and Location

SBCWD is located in northern San Benito County, south of Santa Clara Valley. The SBCWD service area covers 47,540 acres. Of this total, about 5,107 acres are located outside the authorized POU. These lands are shown in Figure 3-18.

3.4.17.2 Land Use and Land Use Policies

The SBCWD service area is located within the incorporated and unincorporated lands of San Benito County. The County General Plan designates these lands for primarily general agriculture, rangeland, urban, rural residential, flood zone, and parks and recreation uses.

Of the 5,107 acres located outside the authorized POU, 2,564 acres are encroachment lands and 2,543 acres are expansion lands. 2,564 acres are in an agricultural land use receiving CVP water supplies, 1,877 acres are in an agricultural land use with non-CVP water supplies, 96 acres are in dryland agriculture, and 420 acres are in a M&I land use with non-CVP water supplies. The remaining 150 acres are undeveloped and support native vegetation.



3.4.17.3 Geology and Soils

SBCWD is primarily alluvial plains, fans, and stream benches. In low areas of alluvial plains and fans, the soils are poorly drained clay to clay loam. All other soils in this area are well-drained clay, silt, and gravelly loams.

3.4.17.4 Water Resources and Water Use

SBCWD has a contract for the delivery of 43,800 acre-feet of water. CVP water use is restricted to agricultural and M&I purposes consistent with the CVP contract terms.

CVP water delivery service to the northeast area of SBCWD located outside the authorized POU began in 1990. The majority of the northeast area of SBCWD located outside the authorized POU currently receives CVP water for irrigation of orchards, row crops, and pasture. Prior to receiving CVP water, groundwater was used. A small amount of land in the northeast area of SBCWD was historically and is currently dryland agriculture.

The southeast portion of SBCWD outside the authorized POU uses CVP water for irrigation and M&I use. It previously was dryland agriculture, native pasture, or orchard using groundwater. The adjacent area to the west does not receive CVP water and is developed for M&I use with groundwater. Further to the west, lands currently receive CVP water, and also use groundwater for row crops, native pasture, and M&I use. Initial CVP water delivery service to these areas was in 1990.

The western area, which includes the City of San Juan Bautista and other M&I uses, does not currently receive CVP water. The agricultural uses in that area are row crops, pasture, and orchards irrigated with groundwater. The northwestern area does not currently receive CVP water; it is an agricultural area with row crops and orchards, and is currently irrigated with groundwater.

SBCWD has also installed groundwater wells to support existing land uses. Prior to the introduction of CVP water supplies, the 420 acres of M&I lands and the 4,537 acres of agricultural lands were supplied by other sources of water. SBCWD has historically used up to 20,117 acre-feet of water per year.

3.4.17.5 Groundwater Resources

SBCWD lands outside the authorized POU have access to approximately 8,200 acre-feet per year of groundwater from district-owned wells. There is no indication that groundwater use would be limited by water quality issues.

3.4.17.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-33 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill riparian/fresh emergent wetland	0	20	0	0	27	47
Mixed chaparral	0	0	0	0	507	507
Annual grassland	0	2,544	0	0	2,009	4,553
TOTAL	0	2,564	0	0	2,543	5,107

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 21 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, four species (the California red-legged frog, San Joaquin kit fox, valley elderberry longhorn beetle, and peregrine falcon) are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, the California red-legged frog, San Joaquin kit fox, and San Joaquin saltbush have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.17.7 Cultural Resources

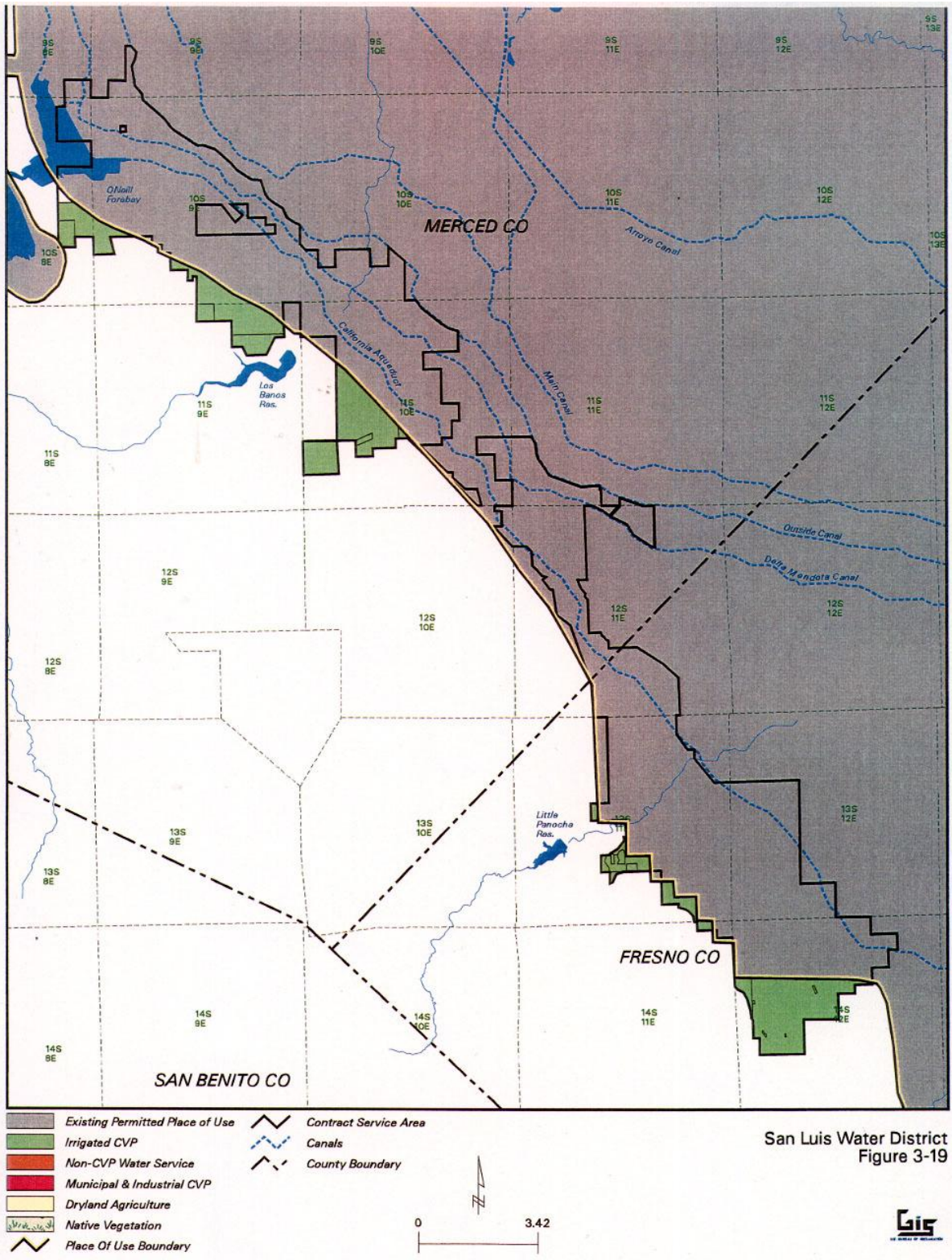
Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, one site has been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering small habitation locales and historic sites during agricultural development.

3.4.18 San Luis Water District

San Luis Water District (SLWD) entered into a long-term water service contract (No. 14-06-200-7773A) with Reclamation for CVP water delivery on June 18, 1974.

3.4.18.1 General Description and Location

SLWD is located in western Fresno County and southwestern Merced. The SLWD service area covers 64,668 acres. Of this total, about 9,609 acres are located outside the authorized POU. These lands are shown in Figure 3-19.



3.4.18.2 Land Use and Land Use Policies

The SLWD service area is located within the unincorporated lands of Fresno and Merced counties. The Fresno County General Plan designates these lands for primarily general agriculture and rangeland, and the Merced County General Plan designates these lands for rangeland.

Most of the lands are irrigated. Lands owned by the United States have never received water from SLWD. Prior to receiving CVP water, the lands were cultivated in the winter in dryland agriculture and were used for pasture. All lands outside the authorized POU (9,609 acres) are encroachment lands and were first irrigated using CVP water in 1975.

3.4.18.3 Geology and Soils

The San Joaquin Valley is a structural trough bounded by the Coast Range on the west. The valley deposits consist of several thousand feet of Cenozoic sedimentary rocks and unconsolidated alluvium that reflect their geologic sources in the surrounding highlands and their fluvial and alluvial depositional environments.

Eocene marine rocks, exposed in the Coast Range, are the primary source of elevated selenium concentrations in soil, sediment, and groundwater in the San Joaquin Valley. Particulates and dissolved ions are transported to the valley floor by weathering and erosion of the mineral-rich source rocks. Soils in the San Joaquin Valley with selenium concentrations above the median concentration for U.S. soils of 0.3 mg/kg (Shacklette et al., 1974) are adjacent to the Coast Range where marine rocks are exposed (Gilliom et al., 1989).

Soils in the SLWD are located in the valley basin or on alluvial fans of the coast range foothills, and are generally saline or sodic with selenium concentrations between 0.13 and 1.07 mg/kg (Tidball et al., 1986).

3.4.18.4 Water Resources and Water Use

SLWD has a contract for the delivery of 125,080 acre-feet of water. CVP water use is restricted to agricultural and M&I purposes consistent with the CVP contract terms. CVP water was first delivered to the areas outside the authorized POU in 1975.

Prior to the introduction of CVP water supplies, agricultural lands and pastures outside the authorized POU did not receive water supplies from other sources. Maximum usage by SLWD occurred in 1984 and totaled 144,894 acre-feet. Average usage between 1978 and 1989-90 totaled 125,029 acre-feet per year.

3.4.18.5 Groundwater Resources

SLWD uses CVP water exclusively on lands outside the authorized POU, and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.18.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-34 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Alkali scrub	1,601	0	0	0	0	1,601
Annual grassland	7,928	0	0	0	0	7,928
Valley-foothill riparian/ fresh emergent wetland	80	0	0	0	0	80
TOTAL	9,609	0	0	0	0	9,609

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 22 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-35 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, the tricolored blackbird and blunt-nosed leopard lizard have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.18.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, three to four sites may be present on lands outside the authorized POU. These lands were determined to have a low archaeological sensitivity with a high probability of encountering small habitation locales and historic sites during agricultural development and a low probability of encountering such sites during M&I development.

Table 3-35 Threatened and Endangered Species within San Luis Water District		
Habitat	Species	Status
Alkali scrub Annual grassland	San Joaquin woolly-threads	State: -- Federal: Endangered
Alkali scrub Annual grassland	Hoover's eriastrum	State: -- Federal: Threatened
Alkali scrub	Blunt-nosed leopard lizard	State: Endangered Federal: Endangered
Valley-foothill riparian/fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Alkali scrub	Fresno kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	Giant kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin antelope squirrel	State: Threatened Federal: Species of Concern
Alkali scrub Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Species listed are in accordance with state and federal Endangered Species Acts.		

3.4.19 Santa Clara Valley Water District

Santa Clara Valley Water District (SCVWD) entered into a long-term water service contract (No. 7-07-20-W0023) with Reclamation for CVP water delivery on June 7, 1977.

3.4.19.1 General Description and Location

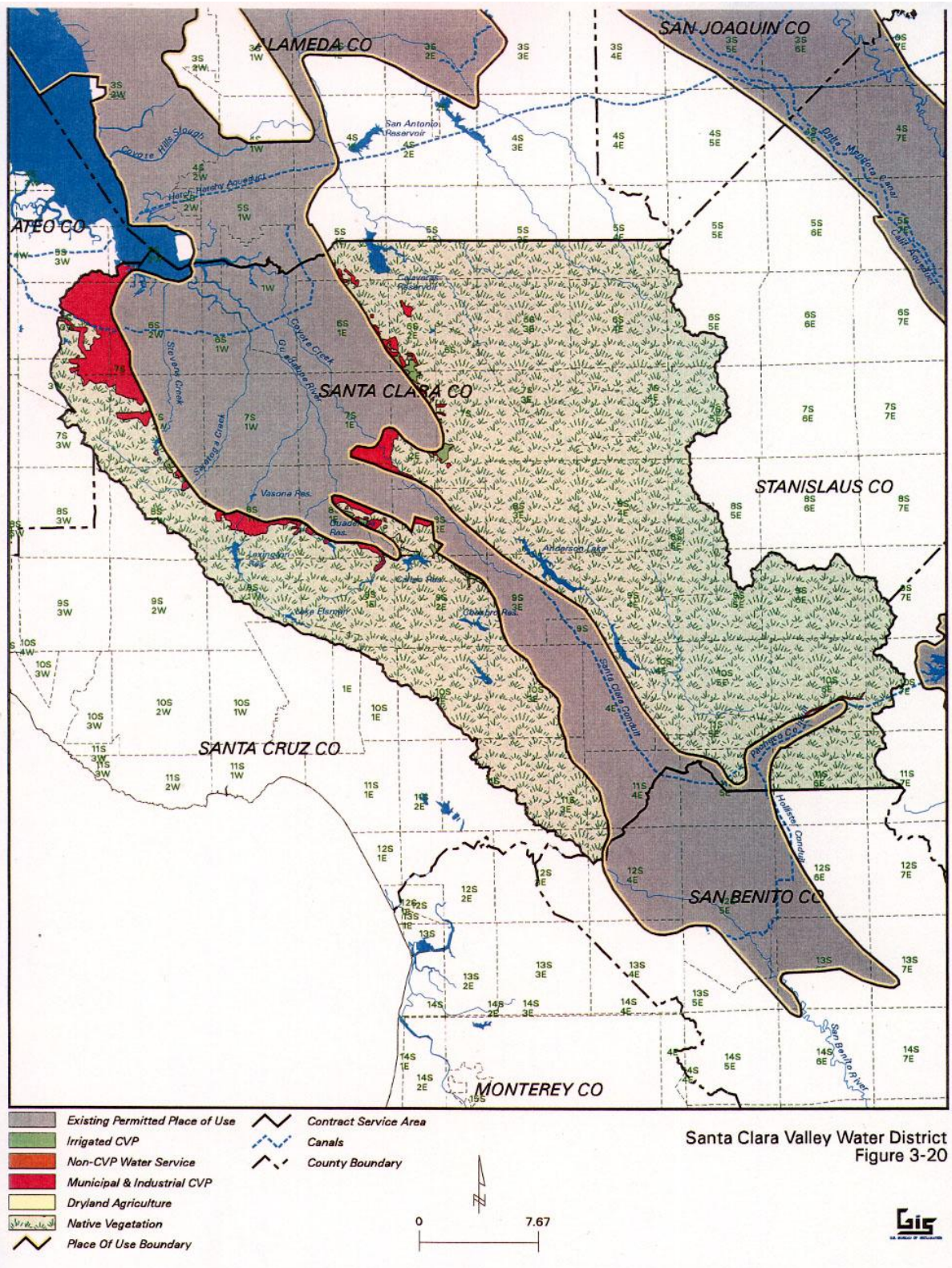
SCVWD is located in Santa Clara County south of the San Francisco Bay. The contract service area covers the entire county of Santa Clara even though there are no plans to deliver CVP water to most of that area.

Of the 835,200 acres in the County, about 592,988 acres are located outside the authorized POU. These lands are shown in Figure 3-20.

3.4.19.2 Land Use and Land Use Policies

The SCVWD service area is located within the incorporated and unincorporated lands of Santa Clara County. The Santa Clara County General Plan designates these lands for all uses except flood zone.

Of the 592,988 acres located outside the authorized POU, 27,669 acres are encroachment lands and 565,319 acres are expansion lands. 25,498 acres correspond to an M&I land use, 2,171 acres are in irrigated agricultural uses, and the remaining 565,319 acres are undeveloped and support native vegetation.



3.4.19.3 Geology and Soils

SCVWD land outside the authorized POU are located on foothill and mountain formations of the Coast Range. These lands consist of upland soils ranging from shallow to deep, well-drained loams. The loams vary in content throughout SCVWD's service area.

3.4.19.4 Water Resources and Water Use

SCVWD has a contract for the delivery of 152,500 acre-feet of water. The contract specifies that 119,400 acre-feet of water are designated for M&I use, and the maximum available for agricultural use is 33,100 acre-feet. The contract provides for the conversion of irrigation water to M&I.

SCVWD also has groundwater wells to support existing land uses. Water from the SWP and Hetch Hetchy also is supplied to the County. Prior to the introduction of CVP water supplies, the M&I lands and the agricultural lands received water supplies from other sources. SCVWD has historically used up to 118,688 acre-feet of CVP water per year.

3.4.19.5 Groundwater Resources

SCVWD lands outside the authorized POU have access to an unspecified amount of groundwater from privately owned wells. There is no indication that groundwater use would be limited by water quality issues.

3.4.19.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by four vegetative community/habitat types. Table 3-36 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Annual/perennial grassland	0	2,136	0	23,346	139,986	165,468
Montane hardwood	0	27	0	427	113,744	114,198
Valley-foothill hardwood	0	7	0	1,027	174,116	175,150
Mixed chaparral	0	1	0	698	137,473	138,172
TOTAL	0	2,171	0	25,498	565,319	592,988

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 43 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, the species in Table 3-37 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Table 3-37 Threatened and Endangered Species within Santa Clara Valley Water District		
Habitat	Species	Status
Valley-foothill hardwood	California red-legged frog	State: Species of Concern Federal: Threatened
Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Annual/perennial grassland	Bay checkerspot butterfly	State: -- Federal: Threatened
Perennial grassland	Coyote ceanothus	State: -- Federal: Endangered
Perennial grassland	Santa Clara Valley dudleya	State: -- Federal: Endangered
Perennial grassland	Fountain thistle	State: Endangered Federal: Endangered
Valley-foothill hardwood	California sea blite	State: -- Federal: Endangered
Valley-foothill hardwood	Saltmarsh harvest mouse	State: Endangered Federal: Endangered
Valley-foothill hardwood	California clapper rail	State: Endangered Federal: Endangered
Valley-foothill hardwood	California least tern	State: Endangered Federal: Endangered
Valley-foothill hardwood	California black rail	State: Threatened Federal: Species of Concern
Species listed are in accordance with the state and federal Endangered Species Acts.		

Based on a review of the CNDDDB, many special-status species have been observed on lands within the CVP contract service area outside the authorized POU. These include the California tiger salamander, golden eagle, foothill yellow-legged frog, talus fritillary, fragrant fritillary, Sharsmith's harebell, Mt. Hamilton thistle, Mt. Diablo phacelia, Brandegees' eriastrum, California red-legged frog, rock sanicle, Mt. Hamilton coreopsis, long-eared owl, Mt. Hamilton jewelflower, edgewood blind harvestman, most beautiful jewelflower, Santa Clara Valley dudleya, San Joaquin kit fox, Metcalf Canyon jewelflower, Bay checkerspot butterfly, black swift, tricolored blackbird, coyote ceanothus, Santa Cruz tarplant, and Congdon's tarplant.

3.4.19.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, about 450 sites have been recorded on lands outside the authorized POU. These lands were determined to have a high archaeological sensitivity with a low to moderate probability of encountering prehistoric sites during agricultural development and a high probability of encountering prehistoric sites during M&I development.

3.4.20 Shasta Community Services District

Shasta Community Services District (SCSD) entered into a long-term water service contract (No. 14-06-200-862A) on March 25, 1964. The District began delivery of the water for M&I use in July 1964.

3.4.20.1 General Description and Location

SCSD is located in Shasta County northwest of the City of Redding. The SCSD service area covers 6,294 acres. Of this total, about 51 acres are located outside the authorized POU. These lands are shown in Figure 3-21.

3.4.20.2 Land Use and Land Use Policies

The SCSD service area is located within the unincorporated lands of Shasta County. The Shasta County General Plan designates these lands for rural residential, commercial, public lands, and open space uses.

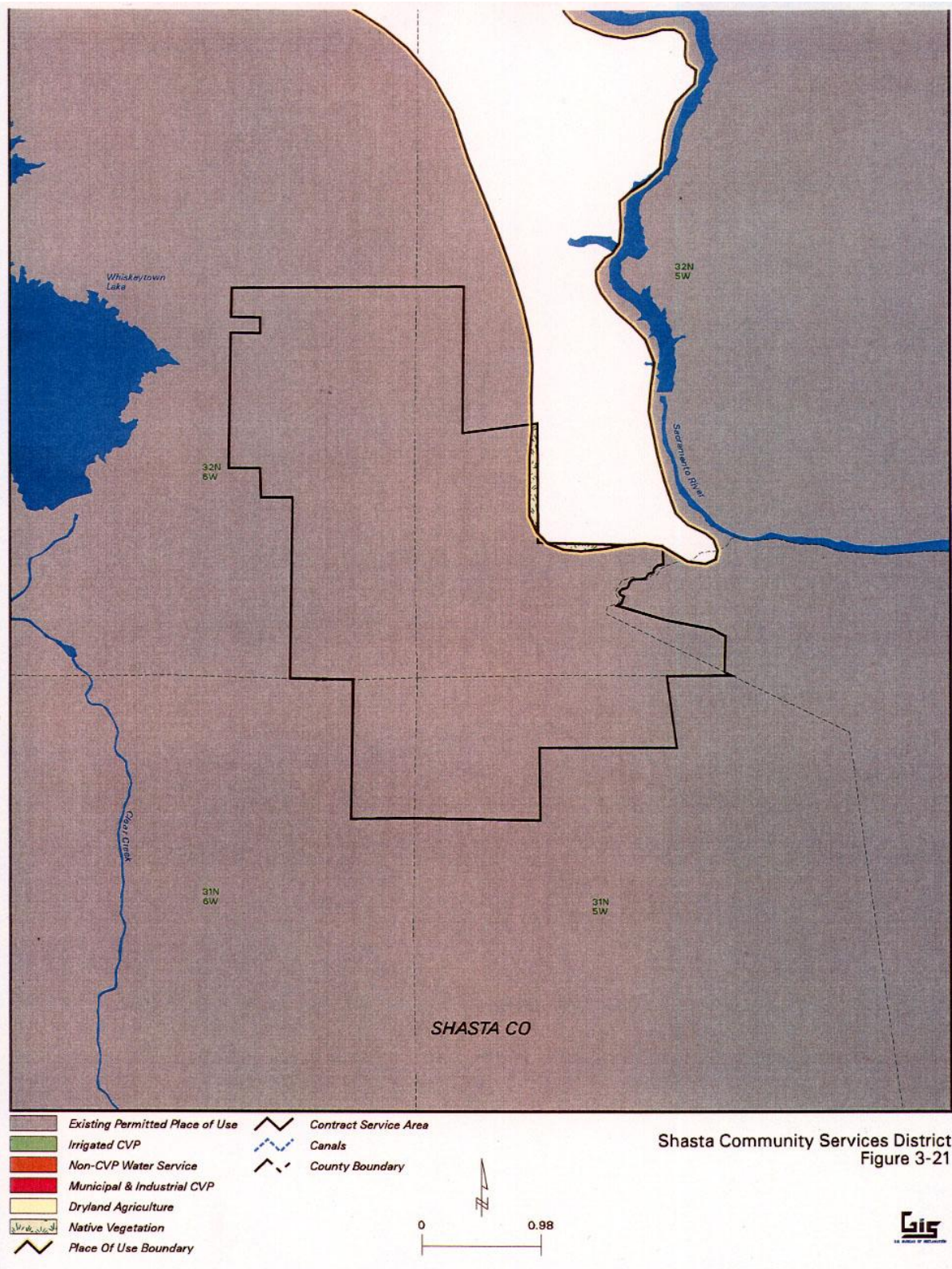
The 51 acres located outside the authorized POU are expansion lands, currently in their natural habitat. Although they are capable of being developed, there are no plans to develop them in the near future. SCSD primarily has rural residences, consisting of 2½-acre minimum to 40-acre parcels. There is no major industrial enterprise in the area.

3.4.20.3 Geology and Soils

SCSD is located in areas consisting of both foothill and mountain geologic formations. Soils in these areas range from metamorphosed volcanic rock and gravelly loams to coarse sands underlain by granitic rocks.

3.4.20.4 Water Resources and Water Use

SCSD has a contract for the delivery of 1,000 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. CVP water is not delivered to lands outside the authorized POU.



Shasta Community Services District
Figure 3-21

CVP water is SCSD's primary source of surface water supply. There are a few privately owned wells in the district. CVP water is delivered to the district downstream of the Spring Creek Conduit.

3.4.20.5 Groundwater Resources

SCSD does not use CVP water on lands outside the authorized POU. The area is not currently developed. There are a few privately owned wells within the district. It is unknown whether groundwater supply sources could meet the water demand of future uses on these lands.

3.4.20.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-38 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	0	16	16
Mixed chaparral	0	0	0	0	35	35
TOTAL	0	0	0	0	51	51

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 11 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, four species (the Shasta salamander, Swainson's Hawk, peregrine falcon, and bald eagle) are designated as threatened or endangered in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.20.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, one site has been recorded on lands outside the authorized POU. These lands were determined to have a moderate archaeological sensitivity with a moderate probability of encountering prehistoric sites.

3.4.21 Shasta County Service Area No. 6—Jones Valley

Shasta County Service Area No. 6—Jones Valley (Jones Valley) entered into a long-term water service contract (No. PW-1) with Shasta County Water Agency (No. 14-06-200-3367A) on July 22, 1980. That contract will expire December 31, 2004.

3.4.21.1 General Description and Location

Jones Valley is located in Shasta County, northeast of the City of Redding, just south of Shasta Lake. The Jones Valley service area covers 1,171 acres. The entire service area is located outside the authorized POU. These lands are shown in Figure 3-22.

3.4.21.2 Land Use and Land Use Policies

The Jones Valley service area is located within the unincorporated lands of Shasta County. The Shasta County General Plan designates these lands for rangeland, rural residential, and open space uses.

The service area is primarily rural residential, with 2½-acre to 40-acre parcels. There are no plans for major development in the area.

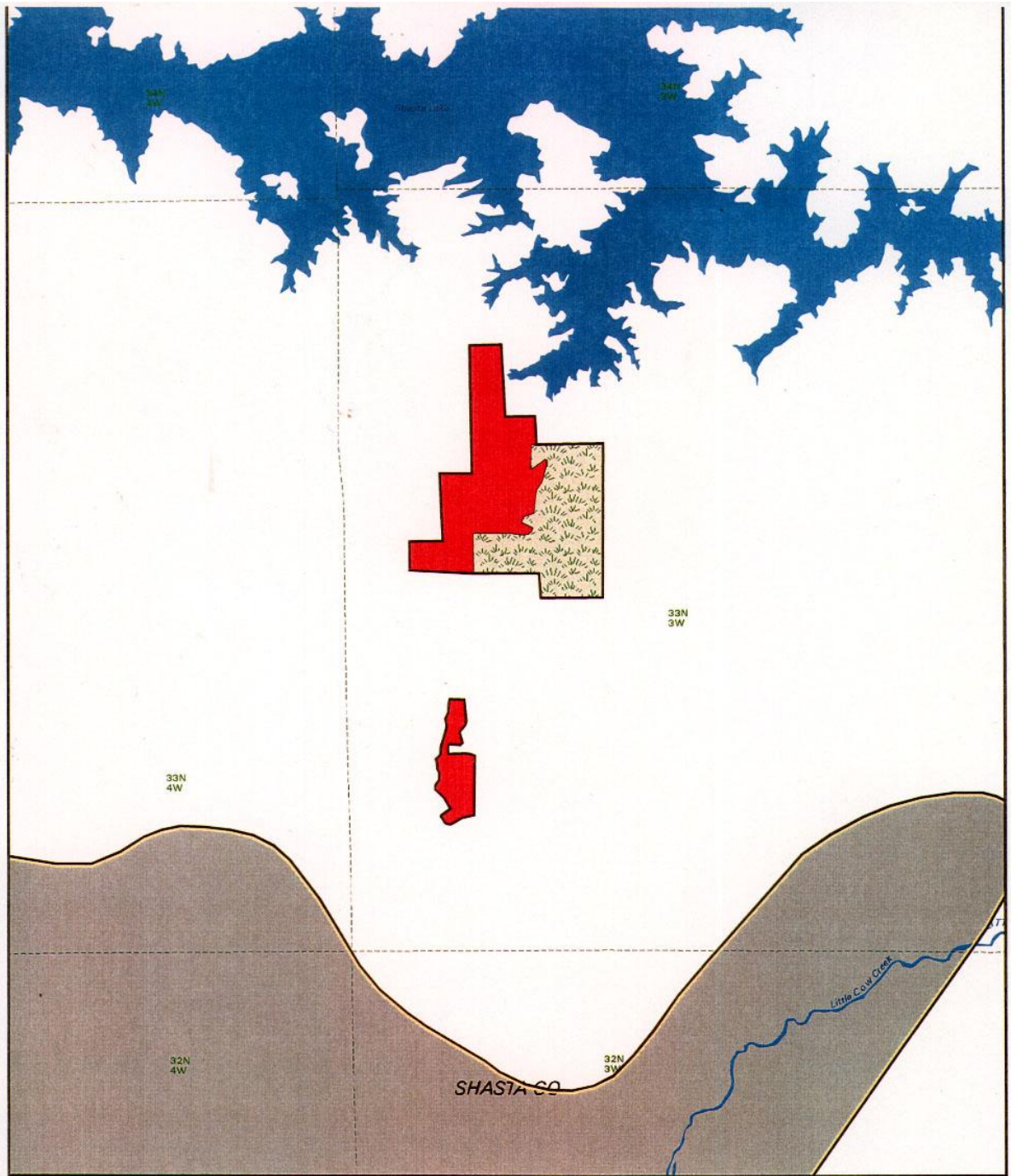
Of the 1,171 acres located outside the authorized POU, 668 acres are encroachment lands and 503 acres are expansion lands. 668 acres correspond to a M&I land use, and the remaining 503 acres are undeveloped and support native vegetation.

3.4.21.3 Geology and Soils











The majority of Jones Valley is found on alluvial valley deposits; however, the Jones Valley area extends into areas composed of foothill materials and soils. Valley soil types consist of well-drained clay loams, and the foothill soil types consist of well-drained to excessively-drained sandy loams.

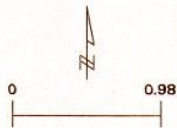
3.4.21.4 Water Resources and Water Use

Jones Valley has a contract for the delivery of 190 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. CVP water is delivered to the contractor from Shasta Lake by the Shasta County Water Agency.



Shasta County Service Area No. 6-Jones Valley
Figure 3-22

- | | |
|---|---|
|  Existing Permitted Place of Use |  Contract Service Area |
|  Irrigated CVP |  Canals |
|  Non-CVP Water Service |  County Boundary |
|  Municipal & Industrial CVP | |
|  Dryland Agriculture | |
|  Native Vegetation | |
|  Place Of Use Boundary | |



The lands that are identified in the encroachment and expansion areas have historically been supplied with groundwater prior to receiving CVP water. CVP water and groundwater are the Jones Valley's only source of water supply.

3.4.21.5 Groundwater Resources

Jones Valley uses CVP water exclusively on lands outside the authorized POU. Although the area was originally developed with local groundwater resources, the area does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.21.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by four vegetative community/habitat types. Table 3-39 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	473	446	919
Annual grassland	0	0	0	22	0	22
Mixed chaparral	0	0	0	155	47	202
Valley-foothill riparian/fresh emergent wetland	0	0	0	18	10	28
TOTAL	0	0	0	668	503	1,171

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 16 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, three species (the Shasta salamander, California red-legged frog, and bald eagle), are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.21.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, two sites have been recorded on lands outside the authorized POU. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites during M&I development.

3.4.22 Shasta County Service Area No. 25—Keswick

Shasta County Service Area No. 25—Keswick (Keswick), was known as the Keswick Community Services District when it entered into a long-term water service contract (No. 14-06-200-1307A) with Reclamation for CVP water delivery on September 16, 1964. The contract will expire December 31, 2009. The Keswick Community Services District was dissolved in December 1990, and was assumed by County Service Area No. 25—Keswick on February 19, 1991.

3.4.22.1 General Description and Location

Keswick is located in Shasta County, northwest of the City of Redding, just west of the Sacramento River. The Keswick service area covers 5,299 acres. Of this total, about 3,635 acres are located outside the authorized POU. These lands are shown in Figure 3-23.

3.4.22.2 Land Use and Land Use Policies

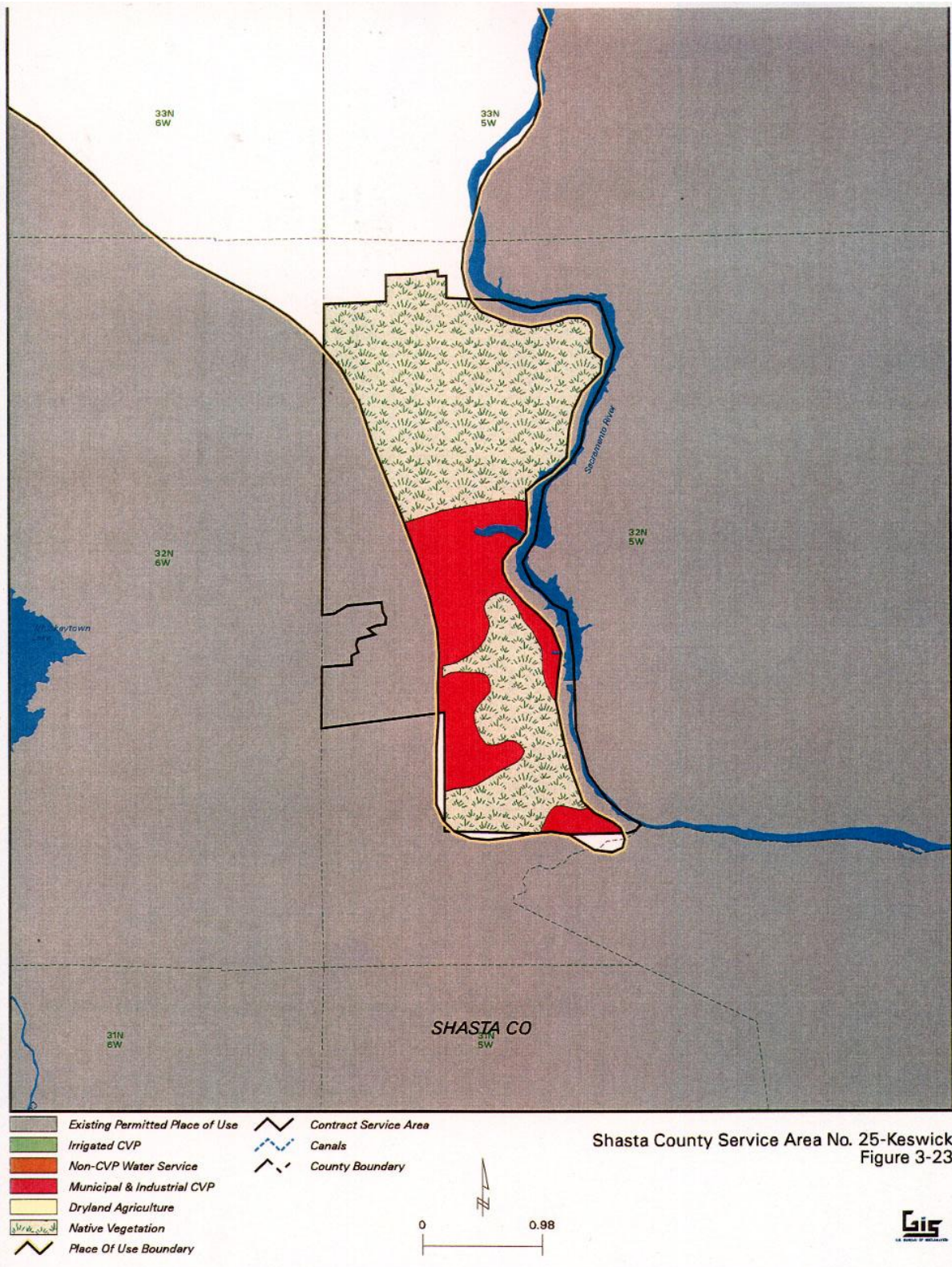
The Keswick service area is located within the unincorporated lands of Shasta County. The Shasta County General Plan designates these lands for rural residential, commercial, industrial, mineral resources, public lands, and open space uses.

The service area is primarily rural residential, with 2½-acre to 40-acre parcels. There are no plans for major development in the area.

Of the 3,635 acres located outside the authorized POU, 918 acres are encroachment lands and 2,717 acres are expansion lands. 918 acres correspond to a M&I land use and the remaining 2,717 acres are undeveloped and support native vegetation.

3.4.22.3 Geology and Soils

Keswick is located in areas consisting of both foothill and mountain geologic formations. Soils in these areas range from metamorphosed volcanic rock and gravelly loams to coarse sands underlain by granitic rocks.



3.4.22.4 Water Resources and Water Use

Keswick has a contract for the delivery of 500 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. CVP water is delivered to Keswick from the Spring Creek Power Conduit.

Prior to the introduction of CVP water supplies, the lands identified in the encroachment and expansion areas have historically been supplied with groundwater. Keswick has historically used as much as 182 acre-feet of water per year.

CVP water and groundwater are Keswick's only sources of water supply.

3.4.22.5 Groundwater Resources

Keswick uses CVP water exclusively on lands outside the authorized POU, and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.22.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-40 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	159	926	1,085
Valley-foothill riparian/fresh emergent wetland	0	0	0	6	53	59
Mixed chaparral	0	0	0	753	1,738	2,491
TOTAL	0	0	0	918	2,717	3,635

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 15 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, three species (the bald eagle, Shasta salamander, and California red-legged frog) are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.22.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, four small habitation/lithic scatter sites have been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites.

3.4.23 City of Shasta Lake

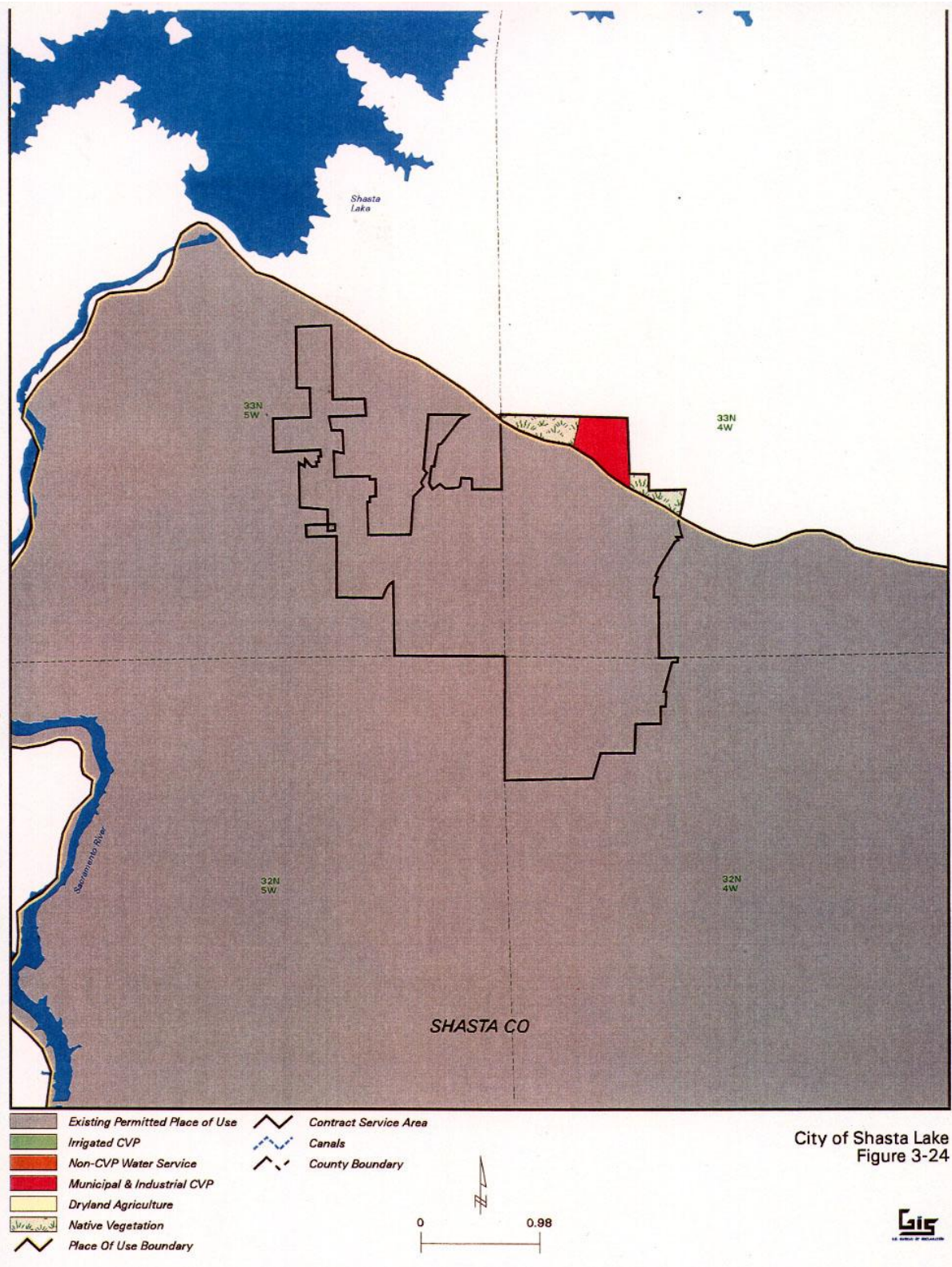
The City of Shasta Lake was known as the Shasta Dam Area Public Utility District when it entered into a long-term water service contract (No. Ilr-1515) with Reclamation for CVP water delivery on August 12, 1948, and amended on September 15, 1955, and July 16, 1957. The Shasta Dam Area Public Utility District assumed the Summit City Public Utility District contract (No. Ilr-1523, as amended on July 19, 1966, and modified by letter dated December 9, 1975). The Shasta Dam Area Public Utility District entered into temporary contracts (No. 8-07-20-W0715, dated August 22, 1988, which expired August 12, 1990; No. 0-07-20-W0885 dated September 19, 1990, which expired August 12, 1992; and No. 2-07-20-W1024, dated September 24, 1992, which expired February 28, 1994). The Shasta Dam Area Public Utility District was dissolved in July 1993, and contract No. 2-07-20-W1024 was assumed by the City of Shasta Lake. The City of Shasta Lake entered into interim renewal contract No. 4-07-20-W1134, dated March 3, 1994, which expired February 28, 1995. The contract was renewed for an interim period of 2 years effective February 28, 1995 (No. 4-07-20-W1134-IR2). Contract No. 4-07-20-W1134-IR3 was entered into on February 28, 1997, for a 1-year period.

3.4.23.1 General Description and Location

The City of Shasta Lake is located in Shasta County, north of the City of Redding. The City of Shasta Lake service area covers 6,979 acres. Of this total, about 231 acres are located outside the authorized POU. These lands are shown in Figure 3-24.

3.4.23.2 Land Use and Land Use Policies

The City of Shasta Lake service area is located within the incorporated and unincorporated lands of Shasta County. The City's and Shasta County's General Plans designate these lands for urban uses.



The lands that are identified in the encroachment and expansion areas have historically been supplied with groundwater prior to receiving CVP water. The area shown in the encroachment area has been using CVP water since the early 1950s. Since the distribution and storage facilities were constructed within the encroachment area in the 1950s, the land use has always been M&I. There is no agricultural use in the service area. Prior to receiving CVP water, the land was used for rangeland and grazing, and was irrigated with groundwater.

The City of Shasta Lake service area includes a lumber mill (Sierra Pacific) and several businesses, including markets and restaurants. The service area consists of primarily residential land uses.

Of the 231 acres located outside the authorized POU, 118 acres are encroachment lands and 113 acres are expansion lands. 118 acres correspond to a M&I land use, and the remaining 113 acres are undeveloped and support native vegetation.

3.4.23.3 Geology and Soils

The City of Shasta Lake is located on primarily foothill geologic formations and soils interspersed with alluvial and valley deposits. The foothill deposits consist of well-drained gravelly loams, and the valley deposits consist of moderately well-drained cobbly clay loams.

3.4.23.4 Water Resources and Water Use

The City of Shasta Lake has a contract for the delivery of 2,750 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. Project water is delivered to the City from Shasta Lake via the Toyon Pipeline.

Prior to the introduction of CVP water supplies, the 118 acres of M&I lands received water supplies from groundwater. The City of Shasta Lake has historically used as much as 2,488 acre-feet of water per year. CVP water and local groundwater are the City's only sources of water supply.

3.4.23.5 Groundwater Resources

Lands located outside the City of Shasta Lake have access to an unspecified amount of groundwater from private wells; however, the volume of available groundwater is limited. There is no indication that groundwater use would be limited by water quality issues.

3.4.23.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-41 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	0	0	71	71
Valley-foothill riparian/fresh emergent wetland	0	0	0	3	1	4
Annual grassland	0	0	0	115	41	156
TOTAL	0	0	0	118	113	231
^a Vegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).						

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 15 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, two species (the Shasta salamander and California red-legged frog) are designated as threatened in accordance with the state Endangered Species Act.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.23.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, four sites have been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites.

3.4.24 Silverthorn Summer Homes, Inc.

Silverthorn Summer Homes Inc. (SSH) entered into a long-term water service contract (No. PW-2) with Shasta County Water Agency (No. 14-06-200-3367A) on June 2, 1981. That contract will expire December 31, 2004.

3.4.24.1 General Description and Location

SSH is located in Shasta County, north of the City of Redding along the southern shore of Shasta Lake. The SSH service area covers 55 acres. The entire service area is located outside the authorized POU. These lands are shown in Figure 3-25.

3.4.24.2 Land Use and Land Use Policies

The SSH service area is located within unincorporated lands of Shasta County. The Shasta County General Plan designates these lands for rural residential uses. All of the 55 acres located outside the authorized POU are encroachment lands, in a rural residential land use.

The lands that are identified in the encroachment area have not been historically supplied with another source of water prior to receiving CVP water. The SSH service area is primarily rural residential, with 2½-acre to 40-acre parcels. There are no plans for major development in the area.

3.4.24.3 Geology and Soils

SSH is located on foothill geologic formations and soils. The foothill deposits consist of well-drained gravelly loams.

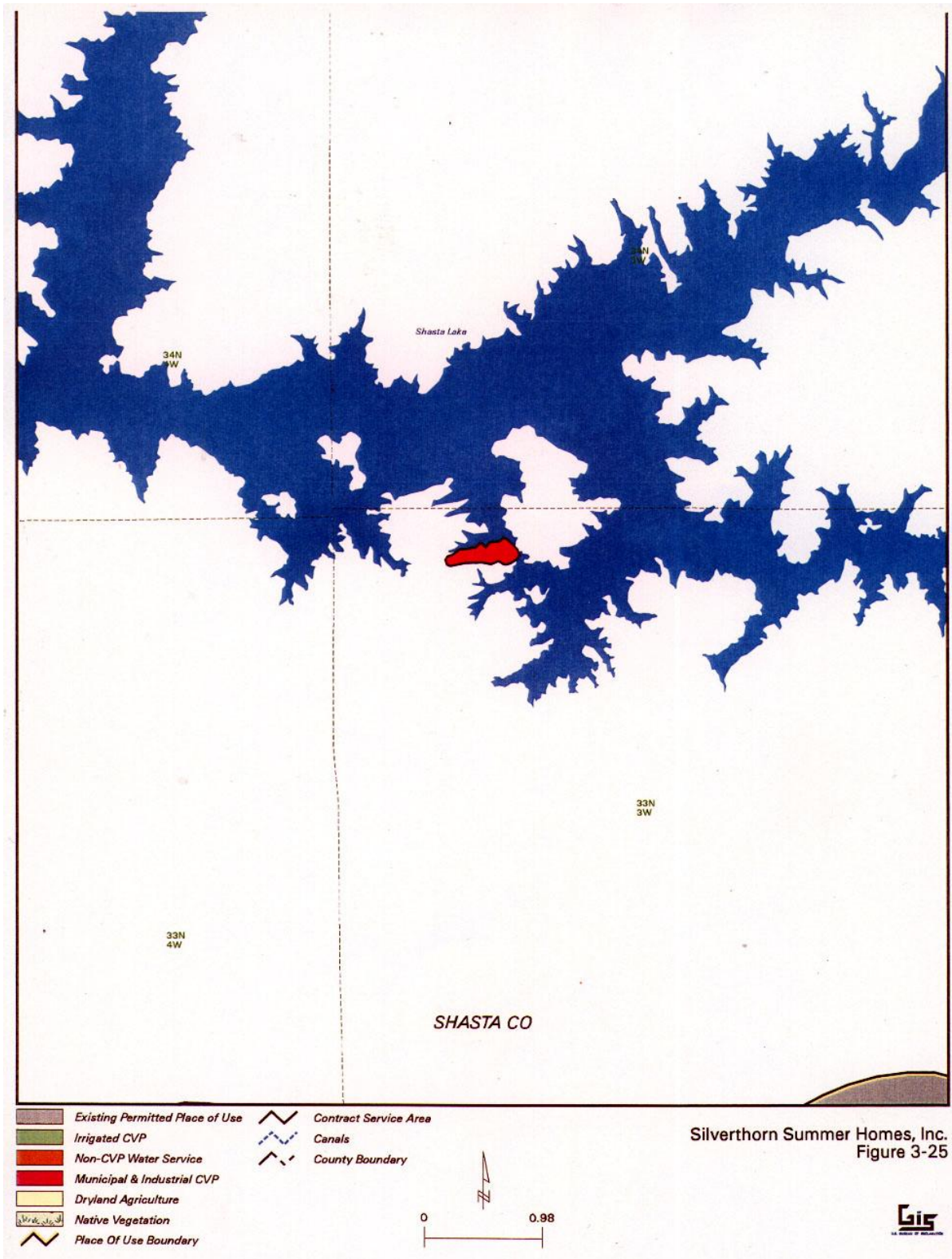
3.4.24.4 Water Resources and Water Use

SSH has a contract for the delivery of 15 acre-feet of water. CVP water use is restricted to M&I purposes consistent with the CVP contract terms. CVP water is delivered to SSH from Shasta Lake by the Shasta County Water Agency.

Prior to the introduction of CVP water supplies, the 55 acres of land in the encroachment area did not receive water supplies from other sources. CVP water is SSH's only source of water supply.

3.4.24.5 Groundwater Resources

SSH is located outside the authorized POU, and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.



3.4.24.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by two vegetative community/habitat types. Table 3-42 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood-conifer	0	0	8	0	0	8
Mixed chaparral	0	0	47	0	0	47
TOTAL	0	0	55	0	0	55

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the four special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species listed in Table D-2, two species (the bald eagle and Shasta salamander) are designated as threatened and endangered in accordance with the state and federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.24.7 Cultural Resources

Based on a 1996 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded on lands outside the authorized POU. These lands were determined to have a low archaeological sensitivity with a low probability of encountering prehistoric sites.

3.4.25 Westlands Water District

Westlands Water District (Westlands) entered into a long-term water service contract (No. 14-06-200-495A) with Reclamation for CVP water delivery on June 5, 1963. In addition to the service contract, Westlands is entitled to receive an additional supply of CVP water pursuant to the judgement *Barcellos & Wolfsen, Inc. v. Westlands Water District* and *Westlands Water District v. United States* entered on December 31, 1986. Westlands' total entitlement to CVP water is 1,150,000 acre-feet per year.

3.4.25.1 General Description and Location

Westlands is located along I-5, primarily in Fresno County, with a portion of the district located in Kings County. The Westlands service area covers 605,548 acres. Of this total, about 49,401 acres are located outside the authorized POU. These lands are shown in Figure 3-26.

3.4.25.2 Land Use and Land Use Policies

The Westlands service area is located within unincorporated lands of Fresno and Kings counties. The Fresno County General Plan designates these lands for general agriculture, rangeland, public facilities, mineral resources, and parks and recreation. The Kings County General Plan designates these lands for general agriculture and rangeland.

Of the 49,401 acres located outside the authorized POU, 36,419 acres are encroachment lands and 12,982 acres are expansion lands. 33 acres correspond to a M&I land use, 36,386 acres are in irrigated agricultural uses, 250 acres are dryland agricultural uses, and the remaining 12,732 acres are undeveloped and support native vegetation.

3.4.25.3 Geology and Soils

Westlands is located in the southern San Joaquin Valley west of Fresno. The San Joaquin Valley is a structural trough bounded by the Coast Range on the west. The valley deposits consist of several thousand feet of Cenozoic sedimentary rocks and unconsolidated alluvium that reflect their geologic sources in the surrounding highlands and their fluvial and alluvial depositional environments.

Eocene marine rocks, exposed in the Coast Range are the primary source of elevated selenium concentrations in soil, sediment, and groundwater in the San Joaquin Valley. Particulates and dissolved ions are transported to the valley floor by weathering and erosion of the mineral rich source rocks. Soils in the San Joaquin Valley with selenium concentrations above the median concentration for U.S. soils of 0.3 mg/kg (Shacklette et al., 1974) are adjacent to the Coast Range, where marine rocks are exposed (Gilliom et al., 1989).

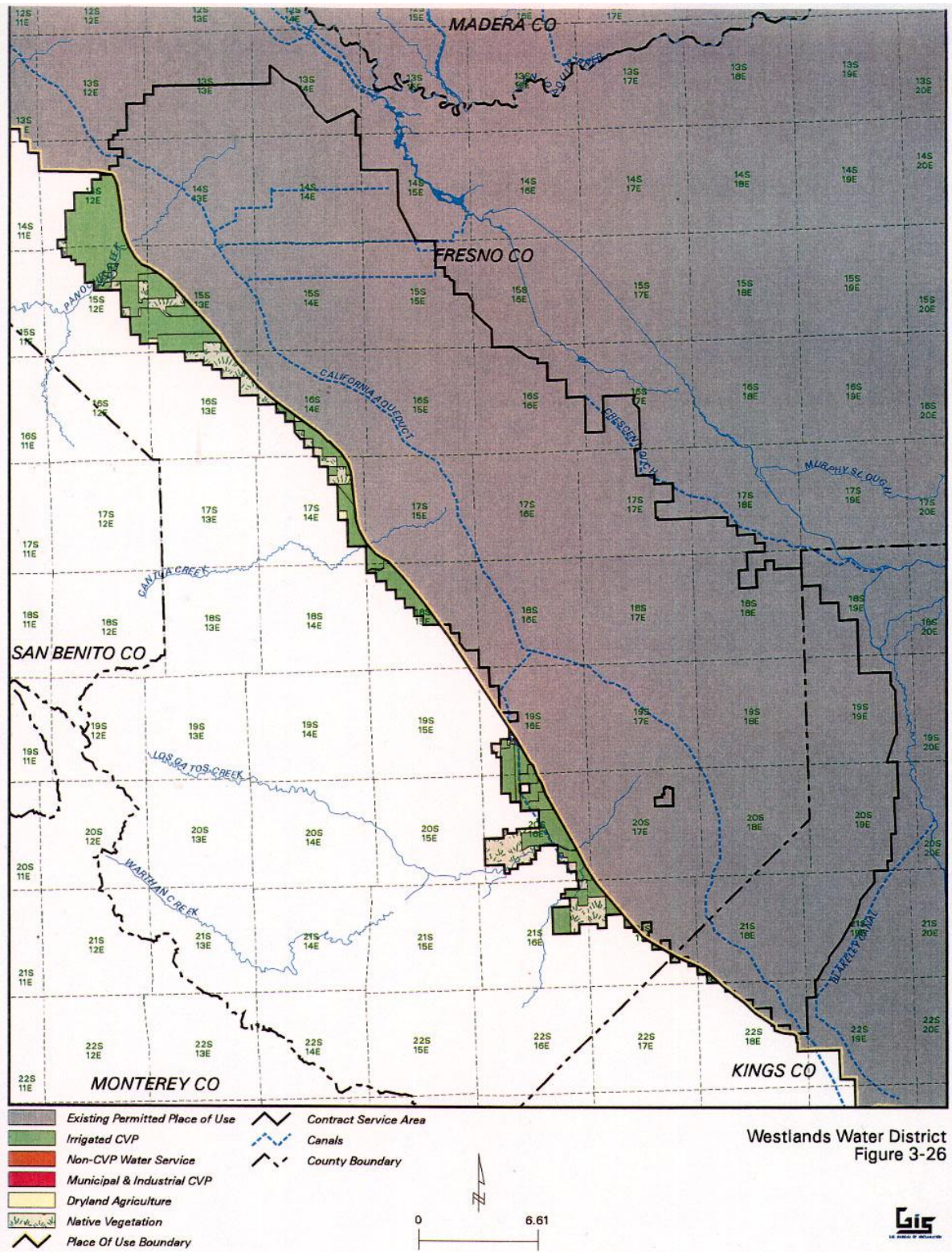
Soils in Westlands are generally saline or sodic soils on the valley floor or on alluvial fans of the Coast Range foothills, and have selenium concentrations between 0.13 and 1.07 mg/kg (Tidball et al., 1986).

3.4.25.4 Water Resources and Water Use

Westlands total entitlement to CVP water is 1,150,000 acre-feet per year. CVP water use is restricted to agricultural and M&I purposes consistent with the CVP contract terms.

Prior to the introduction of CVP water supplies, the 36,419 acres of agricultural and M&I lands encroached by CVP water did not receive water supplies from sources other than groundwater. Westlands has historically used as much as 1,441,000 acre-feet of water per year.

SECTION 3 ENVIRONMENTAL SETTING



3.4.25.5 Groundwater Resources

Westlands lands outside the authorized POU have access to an unspecified amount of groundwater from private wells as an alternative to CVP supplied water. The quantity of available water is limited, and past pumping has caused groundwater overdrafts to occur in Westlands.

Elevated selenium concentrations are found in some soils in Westlands (Tidball et al., 1986). These elevated selenium concentrations were found along the eastern boundary of the district. Subsurface drainage has been installed in many agricultural areas to flush selenium and other trace elements below the root zone (Gilliom et al., 1989); however, none of the lands outside the authorized POU are drained by such drainage systems. Generally, groundwater used for irrigation in Westlands is drawn from beneath the Corcoran clay layer and is of good quality.

3.4.25.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-43 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Alkali scrub	28,284	0	33	0	8,662	36,979
Valley-foothill riparian/ fresh emergent wetland	36	0	0	0	26	62
Annual grassland	8,066	0	0	0	4,294	12,360
TOTAL	36,386	0	33	0	12,982	49,401

^aVegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).

Table D-1 lists vegetative and wildlife species commonly found in each of these community and habitat types. Table D-2 lists the 23 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Of the species in Table D-2, the species in Table 3-44 are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Table 3-44 Threatened and Endangered Species within Westlands Water District		
Habitat	Species	Status
Alkali scrub Annual grassland	California jewelflower	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin woolly-threads	State: -- Federal: Endangered
Alkali scrub	Blunt-nosed leopard lizard	State: Endangered Federal: Endangered
Annual grassland Fresh emergent wetland	Giant garter snake	State: Threatened Federal: Threatened
Alkali scrub	Fresno kangaroo rat	State: Endangered Federal: Endangered
Alkali scrub Annual grassland	San Joaquin antelope squirrel	State: Threatened Federal: Species of Concern
Alkali scrub Annual grassland	San Joaquin kit fox	State: Threatened Federal: Endangered
Species listed are in accordance with the state and federal Endangered Species Acts.		

Based on a review of the CNDDDB, the giant kangaroo rat, San Joaquin dune beetle, San Joaquin woolly-threads, panoche peppergrass, San Joaquin antelope squirrel, blunt-nosed leopard lizard, and San Joaquin pocket mouse have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.25.7 Cultural Resources

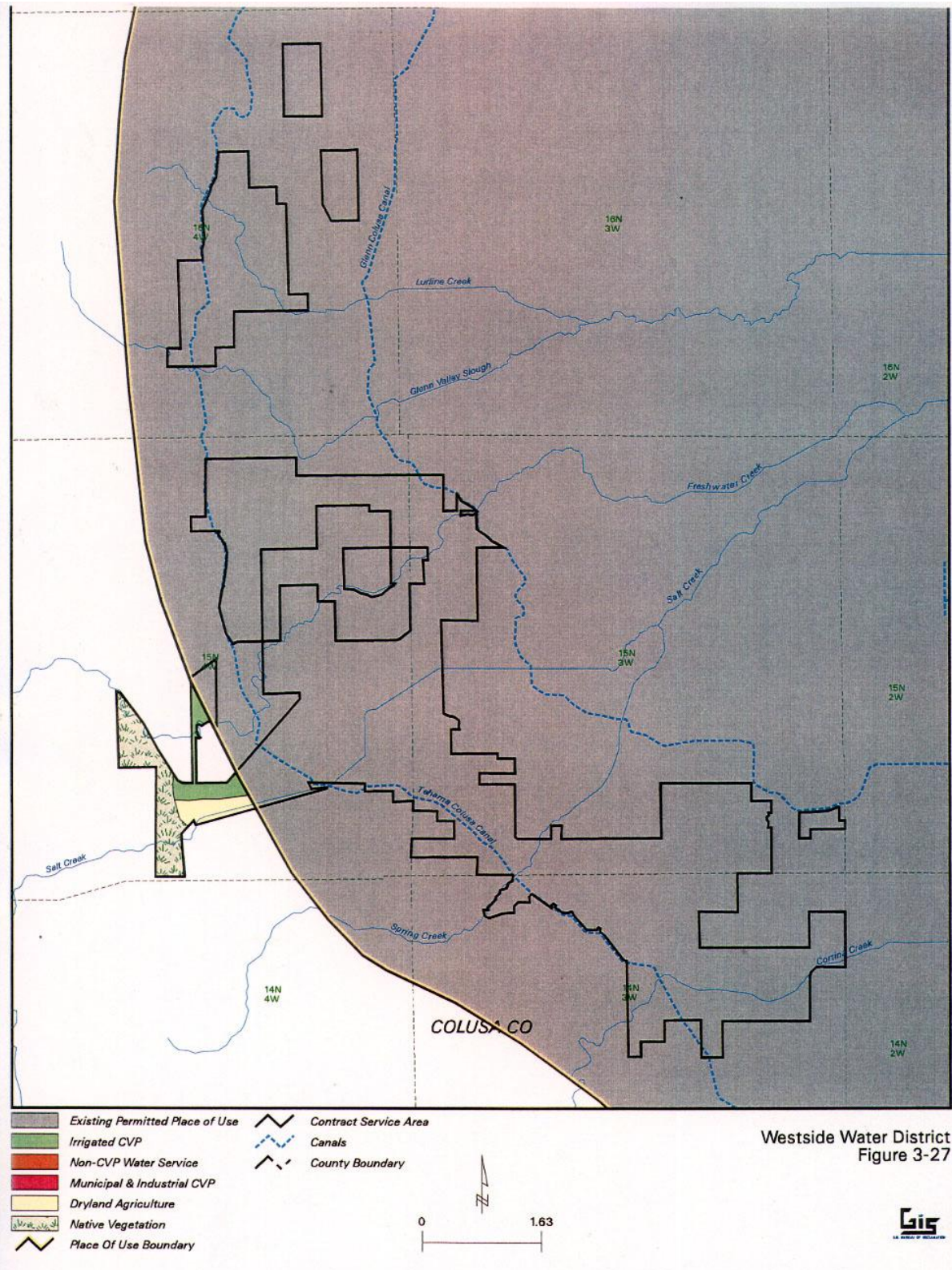
Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, no sites have been recorded. These lands were determined to have a moderate to high archaeological sensitivity with a moderate probability of encountering prehistoric sites and historic-era sites or features.

3.4.26 Westside Water District

Westside Water District (Westside) entered into a long-term water service contract (No. 14-06-200-8222) with Reclamation for CVP water delivery on September 16, 1964. That contract expired on February 28, 1995. The contract was renewed for an interim period of 3 years effective March 1, 1995 (No. 14-06-200-8222-IR1).

3.4.26.1 General Description and Location

Westside is located in Colusa County in the southern portion of the Sacramento Valley. The Westside service area covers 17,479 acres. Of this total, about 997 acres are located outside the authorized POU. Lands within the CVP contract service area that are located outside the authorized POU are shown in Figure 3-27.



Westside Water District
Figure 3-27

3.4.26.2 Land Use and Land Use Policies

The Westside service area is located within the unincorporated lands of Colusa County. The County's General Plan designates these lands for primarily general agricultural, rangeland, mineral resources, and parks and recreation uses.

Of the 997 acres located outside the authorized POU, 239 acres are encroachment lands and 758 acres are expansion lands. 239 acres are in irrigated agricultural land use, 185 acres are in dryland agricultural use, and the remaining 573 acres are undeveloped and support native vegetation.

Westside records indicate that lands classified as irrigable have a history of cultivation. The remaining lands are classified as Class 6, non-irrigable lands.

3.4.26.3 Geology and Soils

Most of the soils of the valley floor are alluvial silt loams, clays, and sands formed from the sedimentary igneous and metamorphic rocks deposited by the Sacramento River and various side channels. The sedimentary deposits on the valley floor form some of Colusa County's prime agricultural soils; however, some sediments are poorly drained and pose limitations for agricultural crops (Sedway Cooke Associates, 1989).

3.4.26.4 Water Resources and Water Use

The contract provides for up to 25,000 acre-feet of CVP water. CVP water use is restricted to agricultural purposes consistent with the CVP water service contract terms. CVP water is Westside's only source of surface water supply.

3.4.26.5 Groundwater Resources

Westside uses CVP water exclusively on lands outside the authorized POU, and does not have alternative groundwater supply sources that could meet the water demand of existing and future uses on these lands.

3.4.26.6 Vegetation and Wildlife

Lands located outside the authorized POU either are currently or were historically occupied by three vegetative community/habitat types. Table 3-45 identifies each of these types and the corresponding acreage within the CVP contract service area that is located outside the authorized POU.

Table D-1 lists vegetative and wildlife species commonly found in these habitat types. Table D-2 lists the 18 special-status species, designated by federal and state resource agencies, that are expected to have been present on encroachment lands prior to development with irrigation water supplies and are expected to be present on expansion lands.

Habitat Type	Acres in Encroachment Area				Acres in Expansion Area	Total Acres
	CVP-Induced Agriculture	Non-CVP-Induced Agriculture	CVP-Induced M&I	Non-CVP-Induced M&I		
Valley-foothill hardwood	0	0	0	0	285	285
Valley-foothill riparian/fresh emergent wetland	0	1	0	0	9	10
Annual grassland	0	238	0	0	464	702
TOTAL	0	239	0	0	758	997
^a Vegetation types and habitat communities have been defined according to the Wildlife Habitat Relationships system (Holland and Keil, 1989).						

Of the species listed in Table D-2, two species (the valley elderberry longhorn beetle and peregrine falcon) are designated as threatened or endangered in accordance with the state or federal Endangered Species Acts.

Based on a review of the CNDDDB, no special-status species have been observed on lands within the CVP contract service area outside the authorized POU.

3.4.26.7 Cultural Resources

Based on a 1992 general cultural resources assessment that included a literature/archival search at the California Information Center, one site has been recorded. These lands were determined to have a high archaeological sensitivity with a high probability of encountering prehistoric sites.